

New Symptoms Analysis System base in Patient Queue

Case Study : Panti Rapih Hospital

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Abstract— One of the rapidly evolving technology in the field of computer technology is in mobile. In the health sector outpatient registration is very important, using mobile technology is expected to registration can be more easily done and the data can be used for data mining. This is the background for the author to build a new symptoms analysis expert system from a queue of patients. The concept of web development is the ease and speed in processing the registration. This is supported by a web simplicity and ease, for the officers to process the incoming queue and the data become the database for the symptoms analysis expert system. Queue process carried out by mobile equipment owned by patients who have registered themselves. System development is done by conducting a case study in the Panti Rapih Hospital. Application testing is performed by the respondents consisting of patients, doctors, officers and employees of medical records receptionist.

Keywords: *outpatient registration, symptom, system*

I. INTRODUCTION

No human in this world was never sick and still the populaton are growth, this creates a business within the scope of ministry to the sick increased. In Panti Rapih hospital there is about 1000 patiens are register every day. Ministry to the sick has not only resulted in treatment but also the convenience of facilities within the hospital service. Patients are now able to choose services according to their economic level. Population in Indonesia from year to year increases, so does the need for health care and treatment in Indonesia. The number of hospitals, drug consumption, and the number of patients is now also increased following the higher population numbers. Hospitals are now competing to make the service better, and more affordable on the economic aspect and location.

Most people use the manual system patients queue or by using the ticket. Patients are required to register with the receptionist and headed into the queue. This process involves a search for doctor according to type of complaint, doctoral practice schedule, the room where the doctors are looking for, and the number of queues that already exist.

Technologies that exist today make human live easier in many way. In doing queue of patients, WAP technology is still

rarely used. Information system to be built will incorporate technology skills in providing information and processing queue for anyone, anywhere, anytime via cell phone service. Almost everyone now has a mobile phone device. In the mobile telephone device there are a lot of functionality that can be used for a variety of information needs and service requests.

The background is what underlies the author to raise this topic to facilitate the user in this case the patient to seek and queuing process, get symptoms analitical data for best match doctor to visit, and also a user in this case the doctor to see the number of queues. The system also has other functionality that will be discussed in depth later.

II. RESEARCH METHODS

A. Study Methods library

This method is implemented by collecting data or information derived from a variety of good literature books on WML, PHP, and MySQL as well as literature from the internet.

B. Observation methods

These methods make observations independently of the needs and habits of mobile phone users

C. Software Development Methods

1) Analysis of software requirements,

namely the analysis and evaluation needs of the application server and client applications on the phone. The results of the analysis of software models written in technical documents Software Requirements Specification.

2) Design Software,

is done to get the software architectural description, interface description, data description, procedural descriptions. The results of the design of the Software Design Description.

3) Programming Software,

the process of translating the design description and application program interfaces into WML. The results of this stage is a web page that is ready to be published.

4) Software Testing,

Which is a process of testing whether the software functionality is in conformity with the planning documents, description, and Results of Software Testing Document. These methods also take an observations independently of the needs and the habits of mobile phone users

III. REFERENCES

A. Expert System

Expert systems are systems that try to adopt human knowledge to computer, so that computers can solve problems like experts(1). In the construction of this system development system intended for medical activities, therefore the health information system can be defined as a system that includes computer technology and knowledge that is useful to call for support for medical needs(2). Health information systems can be divided into 2 parts, information systems that support medical activities and information systems that support business processes from a medical activities(2). In this study, the system constructed is an information system that supports business processes of a medical activity, a queuing system in which there is an expert system health analysis with case studies in Panti Rapih hospital. Business processes that occur shown in Figure 1.

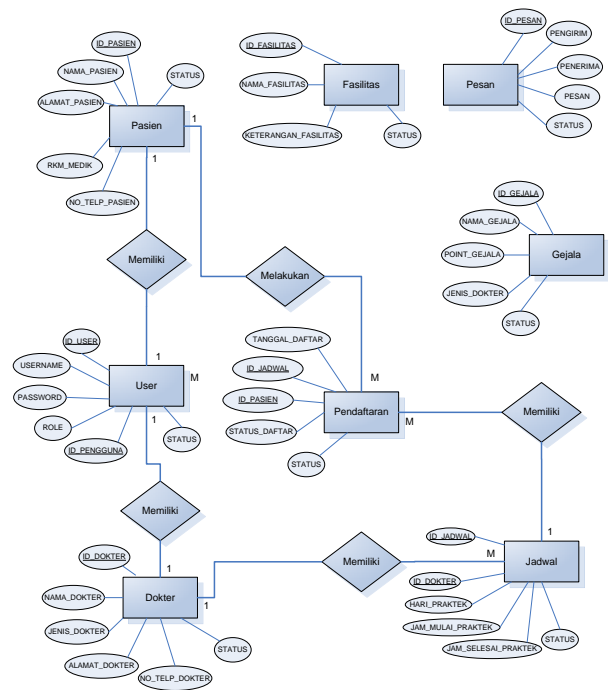


Figure 2. ERD for the system

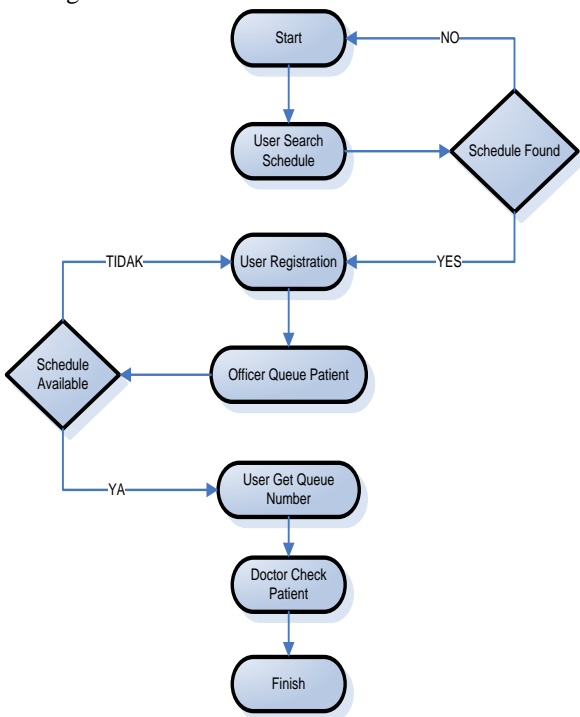


Figure 1. Business Process Flow Chart

B. Entity Relationship Diagram (ERD)

ERD document the existing data on the system by identifying the data entities and relationships that exist between entities. In other words, ERD is a conceptual model describing the relationship between the depositary. Figure 2 is a picture of an Entity Relationship Diagram For The System.

C. Overview of Observations

In the method to be used there are facilities to suit the needs Panti Rapih Hospital. One of the unique system that is made is the ability to analyze the symptoms experienced by patients with the results of the analysis of types of physician referral advice to be visited. This makes the writer made some observations about the symptoms of common diseases treated by a particular physician. Panti Rapih Hospital has 29 major practice services division, namely:

- Internist
- Pulmonary
- Digestive
- Blood disease
- Heart disease specialist
- Specialist gynecology / obstetrics
- Neurology
- Bone surgeon
- Urethral surgery
- Neurosurgery
- Children's surgical specialist
- Plastic surgery
- Tumor surgery
- Surgeon general
- Thorax surgery
- children's diseases specialist

- Eye doctor
- Ear Throat and Nose Specialist
- Radiology specialist
- Radiotherapy Specialist
- Skin diseases specialist
- Nutritionist consultation
- Acupuncture
- General practitioner
- Dentist
- Oral surgery specialist
- Mental illness specialist
- Psychology
- Physiotherapy

And Panti Rapih Hospital also has 5 additional facilities, namely:

- Medical Check Up.
- Diabetica and Dislipedemia Club.
- Gymnastics for Diabetica and Dislipedemia
- Pregnant Gymnastics.
- Billings ovulation method Consultation.

D. *Symphom Keyword*

1. Internist

Symptoms or keywords: fever or heat, pain in the body, cough, flu, diarrhea, shortness of breath, high blood pressure, diabetes, asthma, symptoms of dengue fever (2-3 days of fever, rash, nosebleeds or nasal bleeding), blood disorders, symptoms of anemia (fatigue, lethargy, pallor, dizziness and fatigue), symptoms of hepatitis (fever, brownish color of urine, pain in the gut), decreased appetite.

2. Pulmonary disease specialist

Symptoms or keywords: cough or flu, and asthma.

3. Digestive disease specialists

Symptoms or keywords: diarrhea, symptoms of hepatitis (fever, urinary brownish color, pain in the gut), decreased appetite.

4. Blood disease specialist

Symptoms or keywords: blood disorders, blood pressure, blood is hard freezes.

5. Heart disease specialist

Symptoms or keywords: pain in the left chest, shortness of breath, and high blood pressure.

6. Specialist gynecology / obstetrics

Symptoms or keywords: pregnancy symptoms (nausea, bleeding in the genital (women), irregular menstruation, vaginal discharge, dizziness), miscarriage.

7. Neurology specialist

Symptoms or keywords: tingling, dizziness, impaired balance, slurred speech, back pain, paralysis, high blood pressure.

8. Bone surgeon

Symptoms or keywords: arthritis, physical injuries due to falls, accidents, broken bones.

9. Urethral surgery specialist

Symptoms or keyword: urination is not smooth, cannot urinate, symptoms of kidney stones (bloody urine).

10. Neurosurgery specialists

Symptoms or keywords: head enlarged, an impact head.

11. Specialist children's surgical

Symptoms or keywords: arthritis, physical injuries due to falls, accidents, fractures, diabetes is not smooth, cannot urinate. With the provisions of patients aged 0-12 years.

12. Plastic surgery specialists

Symptoms or keywords: cleft lip, cuts on the face, the desire to change the shape of the face.

13. Tumor surgery specialist

Symptoms or keywords: lump in the body accompanied by pain.

14. Surgeon general

Symptoms or keywords: minor wounds, warts, nail off, bumping or bruising, symptoms of appendicitis (pain in right abdomen).

15. Thorax surgery specialist

Symptoms or keywords: varicose veins, a former dialysis.

16. Specialist children's diseases

Symptoms or keywords: fever or heat, pain in the body, cough, flu, diarrhea, asthma, symptoms of dengue fever (2-3 days of fever, rash, nosebleeds or nose bleeds), diminished appetite. With the provisions of patients aged 0-12 years.

17. Eye disease specialists

Symptoms or keywords: "belekan", "khatarak", nearsightedness, farsightedness, red eyes, ulcers on the eyes, blindness.

18. Specialist ear nose throat diseases

Symptoms or keywords: inflammation, cough, runny nose, hearing loss, dirt in the ear, sinusitis,

runny nose or ears, mouth ulcer, enlargement of the tonsils, difficulty swallowing food, nosebleeds.

19. Radiology specialist

Symptoms or keywords: photo bone, photos thorax, ct scan (head or heart photo), MRI (whole body photo (nerve and paralysis)), photo gear, ultrasound (pregnancy photos or general).

20. Specialist radio therapy

Symptoms or keywords: bones with a light treatment, recovery from surgery, radiation bone.

21. Specialist skin diseases

Symptoms or keywords: itching, lumps, steven johnson, skin blisters, genital diseases, fungus, acne, skin fungus, ringworm, ringworm, white color on the skin.

22. Nutritionist consultation

Symptoms or keywords: thin, fat, obesity, difficulty eating, high cholesterol, diabetes, uric acid.

23. Acupuncture

Symptoms or keywords: acupuncture, alternative actions, obesity, emaciation, insomnia.

24. General practitioner

Symptoms or keywords: fever or heat, pain in the body, inflammation, coughing, colds, flu, diarrhea, symptoms of dengue fever (2-3 days of fever, rash, nosebleeds or nose bleeds), symptoms of hepatitis (fever, urine color brownish, pain in the gut), decreased appetite, nausea, dizziness, tingling, high blood pressure, physical injuries due to falls, accidents, diabetes is not smooth, can not urinate, nosebleeds, mouth sores, itching, skin blisters, genital disease , fungus, skin fungus, ringworm, scabies.

25. Dentist

Symptoms or keywords: kropos on the teeth, holes in the teeth, pain in teeth, braces, tooth extraction, tooth fracture.

26. Oral surgery specialist

Symptoms or keywords: teeth grow abnormally, lump in the gums, bleeding gums, sores in the mouth due to a physical accident.

27. Specialist mental illness

Symptoms or keyword: drug addiction, stress, crazy, depression.

28. Psychology

Symptoms or keywords: counseling psychology, child development, autistic.

29. Physiotherapy

Symptoms or keywords: after post-surgery healing therapies, therapeutic accidents, neurological disease therapy.

And keywords used to search for existing facilities are:

1. Medical Check Up

Symptoms or keywords: checkups, health check.

2. Diabetica and Dislipedemia clubs

Symptoms or keywords: obesity, diabetes.

3. Gymnastics group Diabetica and Dislipedemia

Symptoms or keywords: gymnastics diabetes, obesity gymnastics.

4. Pregnant Gymnastics

Symptoms or keywords: pregnancy exercise, pregnancy exercise.

5. Billings ovulation method consultation

Symptoms or keywords: consulting Billings ovulation. Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”.

IV. SYMPTOMS ANALYSIS

A. Symptoms Data

TABLE I. TABLE SYMPTOM DATA

No	Symptom Data		
	Symptoms	Person/10	Doctor
1	fever	10	Internist
2	painful	10	Internist
3	cough	7	Internist
4	cough	7	Pulmonary
5	asthma	9	Pulmonary
6	diarrhea	6	Digestive
7	hot	5	Digestive
8	Brownish urine	5	Digestive
9	decreased appetite	5	Internist
10	decreased appetite	10	Internist
11	blood disorders	8	Internist
12	High blood pressure	8	Internist
13	abortion	8	gynecology
14	miscarriage	5	gynecology
15	dizziness	5	gynecology
16	irregular menstruation	5	gynecology
17	whitish	10	gynecology
18	pregnant	10	gynecology
19	womb	8	Neurology
20	pins and needles	7	Neurology
21	dizziness	7	Neurology
22	talk hard	10	Neurology
23	hard talk	10	Neurology
24	lumbago	10	Neurology
25	waist pain	10	Neurology
26	fall	10	Bone surgeon
27	accident	7	Bone surgeon
28	fracture	7	Bone surgeon
29	bone fracture	10	Bone surgeon
30	urine is not smooth	10	Bone surgeon
31	can not urinate	7	Urethral surgery
32	kidney stones	7	Urethral surgery

No	Symptom Data		
	Symptoms	Person/10	Doctor
33	bloody urine	10	Urethral surgery
34	Anyang-anyangen	10	Urethral surgery
35	enlarged head	7	Urethral surgery
36	dizziness	7	Neurosurgery
37	collided head	7	Neurosurgery
38	head collision	7	Neurosurgery
39	big head	7	Neurosurgery
40	child's head swell	7	Neurosurgery
41	dizzy boy	5	Children's surgical
42	child's head banged	5	Children's surgical
43	urine is not smooth	5	Children's surgical
44	can not urinate	7	Children's surgical
45	harelip	7	Children's surgical
46	accident on the face	10	Plastic surgery
47	damage to the face	10	Plastic surgery
48	bump	10	Plastic surgery
49	painful	10	Tumor surgery
50	minor injuries	3	Tumor surgery
51	wart	10	Surgeon general
52	loose nails	10	Surgeon general
53	polish off	10	Surgeon general
54	cracked nails	10	Surgeon general
55	physical injuries	10	Surgeon general
56	farises	10	Thorax surgery
57	former dialysis	10	Thorax surgery
58	child has a fever	10	children's diseases
59	child's pain	10	children's diseases
60	child's cough	10	children's diseases
61	khatarak	10	Eye
62	dim	10	Eye
63	nearsighted	10	Eye
64	farsighted	10	Eye
65	Red eye	10	Eye
66	sores in the eyes	10	Eye
67	injury to the eye	10	Eye
68	blindness	10	Eye
69	inflammation	10	Eye
70	cough	7	Ear Throat Nose
71	cold	7	Ear Throat Nose
72	hard of hearing	7	Ear Throat Nose
73	hearing	10	Ear Throat Nose
74	hearing loss	10	Ear Throat Nose
75	earwax	10	Ear Throat Nose
76	clean the ear wax	10	Ear Throat Nose
78	ear	10	Ear Throat Nose
79	nose	10	Ear Throat Nose
80	throat	10	Ear Throat Nose
81	sinusitis	10	Ear Throat Nose
82	bone	10	Radiology
83	thorax	10	Radiology
84	chest	10	Radiology
85	lungs	10	Radiology
86	ct scan	10	Radiology
87	ct-scan	10	Radiology
88	heart scan	10	Radiology
89	Heart Scan	10	Radiology
90	Scan head	10	Radiology
91	scan head	10	Radiology
92	MRI	10	Radiology
93	photo gear	10	Radiology
94	usg	10	Radiology
95	body scan	10	Radiology
96	irradiation	10	radiotherapy
97	recovery operations	10	radiotherapy
98	itch	7	Skin
99	bump	10	Skin
100	steven johnson	10	Skin
101	blister	7	Skin
102	skin	10	Skin
103	venereal disease	7	Skin
104	mushrooms	7	Skin
105	pimple	7	Skin
106	panu	7	Skin
107	ringworm	7	Skin
108	white color of the skin	10	Skin
109	thin	10	Nutritionist consultation
110	obesity	10	Nutritionist consultation
111	fussy eaters	10	Nutritionist consultation
112	diet	10	Nutritionist consultation
113	diet	10	Nutritionist consultation
114	nutrient	10	Nutritionist consultation

No	Symptom Data		
	Symptoms	Person/10	Doctor
115	cholesterol	7	Nutritionist consultation
116	diabetes	7	Nutritionist consultation
117	sugar	7	Nutritionist consultation
118	uric acid	7	Nutritionist consultation
119	needling	10	Acupuncture
120	alternative	10	Acupuncture
121	obesity	10	Acupuncture
122	emaciation	10	Acupuncture
123	insomnia	10	Acupuncture
124	fever	10	General practitioner
125	painful	10	General practitioner
126	cough	7	General practitioner
127	flu	7	General practitioner
128	diarrhea	8	General practitioner
129	hot	8	General practitioner
130	red spots	8	General practitioner
131	mimisen	8	General practitioner
132	Brownish urine	7	General practitioner
133	gag	7	General practitioner
134	vomiting	7	General practitioner
135	pain in the gut	7	General practitioner
136	decreased appetite	3	General practitioner
137	nausea	5	General practitioner
138	nausea	5	General practitioner
139	dizziness	8	General practitioner
140	blood pressure	3	General practitioner
141	High blood pressure	4	General practitioner
142	pins and needles	5	General practitioner
143	fall	7	General practitioner
144	accident	7	General practitioner
145	can not urinate	7	General practitioner
146	urine is not smooth	7	General practitioner
147	Anyang-anyangen	7	General practitioner
148	cold	7	General practitioner
149	inflammation	5	General practitioner
150	sprue	5	General practitioner
151	itch	5	General practitioner
152	blister	4	General practitioner
153	venereal disease	4	General practitioner
154	mushrooms	5	General practitioner
155	panu	7	General practitioner
156	ringworm	7	General practitioner
157	uric acid	7	General practitioner
158	cholesterol	7	General practitioner
159	diabetes	7	General practitioner
160	dental kropsos	7	Dentist
161	tooth	10	Dentist
162	tooth hole	10	Dentist
163	cavities	7	Dentist
164	braces	7	Dentist
165	tooth extraction	10	Dentist
166	broken tooth	7	Dentist
167	lump on gum	10	Oral surgery
168	gum	10	Oral surgery
169	bleeding gums	10	Oral surgery
170	sores in the mouth	10	Oral surgery
171	mouth sores	10	Oral surgery
172	tooth hole	10	Oral surgery
173	cavities	4	Oral surgery
174	tooth extraction	4	Oral surgery
175	drug addiction	5	Mental illness specialist
176	stress	10	Mental illness specialist
177	stress	10	Mental illness specialist
178	crazy	10	Mental illness specialist
179	depression	10	Mental illness specialist
180	want to commit suicide	10	Mental illness specialist
181	counseling	10	Psychology
182	psychology	10	Psychology
183	child development	10	Psychology
184	autism	10	Psychology
185	healing therapy	10	Physiotherapy
186	therapy	10	Physiotherapy
187	physiotherapy	10	Physiotherapy
188	post-accident	10	Physiotherapy
189	accidental therapy	10	Physiotherapy
190	hysteria	10	Physiotherapy

B. Symptoms Algorithms

The algorithms that used to count the doctor suggestion are base on how many person that go to a doctor divided by total person for the symptoms and multiple by one hundred, so we get the percentage for suggestion what are the highest type doctor that good for the symptoms. The algorithms can be write as in

$$Psd = Ps/Pt*100$$

Psd are the result for each recommended type of doctor. Ps are total point for the symptoms word was added by patient and Pt are total point for all the symptoms. These data made the patient know which doctor most frequently visited.

C. Analisis Symptoms System Display

The system that made include the new method shown in Figure 3.

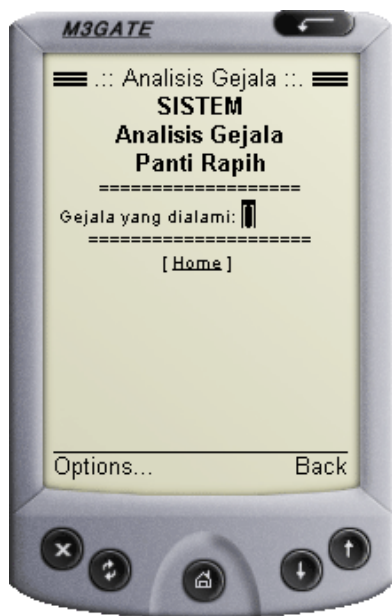


Figure 3. Symptoms Input

After the symptoms input done, The result are shown in like in figure 4.

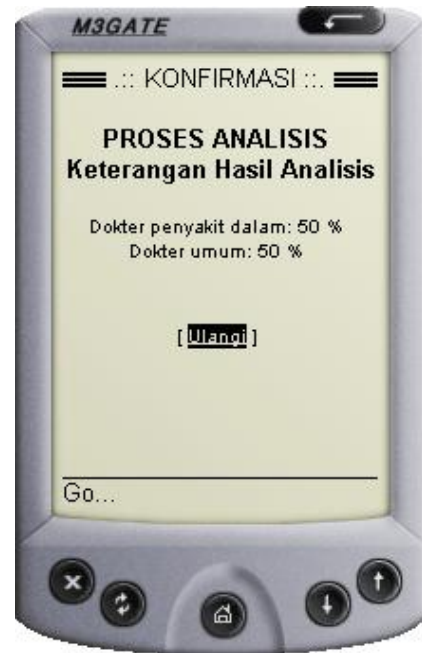


Figure 4. Result Display

SUMMARY

This research is useful to generate new methods that have not been used before. Outcome data from this study can be used for various purposes in the future. The results of existing algorithms is the calculation of the average input data of patients who enter a variety of symptoms.

REFERENCES

- [1] Handayani, Lina dan Tole Sutikno, 2008, Sistem Pakar untuk Diagnosis Penyakit THT Berbasis Web dengan “e2gLite Expert System Shell”, *Jurnal Teknologi Industri Vol. XII No.1 Januari: 19 – 26*, Universitas Ahmad Dahlan.
- [2] Kesh, Someswar., Sam Ramantujan, 2010, Healthcare Information Systems: A Pedagogical Analysis Of Current Degree Programs, *Issues in Information Systems, Volume XI, No. 2*, University of Central Missouri.
- [3] Madcom, 2007, Membuat Aplikasi Database Karyawan Online Berbasis Web dengan Php dan MySql, penerbit Andi.
- [4] Madcoms, 2007, Aplikasi Web Database ASP menggunakan Macromedia Dreamweaver MX, penerbit Andi.
- [5] Marga K, Prisa, 2005, Perancangan Dan Pembuatan Sistem Layanan Informasi Multimedia Interaktif Berbasis Kiosk Di Rumah Sakit Dr.Soetomo Surabaya, Seminar Tugas Akhir.
- [6] Purnomo Sidhi, Thomas Adi, 2004. Laporan Kerja Praktek Sistem Informasi Data Karyawan Di PT Albasia Bhumiphala Persada, Universitas Atma Jaya, Yogyakarta.
- [7] Wilkinson, Judith M., 2002, Buku Saku Diagnosis Keperawatan dengan Intervensi NIC dan Kriteria Hasil NOC, Penerbit Buku Kedokteran EGC.