



UNIVERSITI KEBANGSAAN MALAYSIA
The National University of Malaysia

TITLE:

Cat Symptoms Checker (CSC)

SUBJECT:

Knowledge Based System (TTTC 2243)

GROUP NAME:

Aristocats

LECTURER:

Prof. Dr. Salwani Binti Abdullah

GROUP MEMBERS:

Yeoh Zi Liang	A161004
Ting Tze Sheng	A160979
Chen Hui Xuan	A160687
Loo Xin Yong	A160195

Content

NO	CONTENT	PAGES
1.	1.0 INTRODUCTION	3
2.	2.0 KNOWLEDGE REPRESENTATION <ul style="list-style-type: none">• 2.1 TABLE• 2.2 DECISION TREE• 2.3 DECISION TABLE• 2.4 TREATMENT TABLE	4-11
3.	3.0 INFERENCE ENGINE <ul style="list-style-type: none">• 3.1 RULES• 3.2 INTERFACE• 3.3 FORWARD CHAINING AND BACKWARD CHAINING	12-23
4.	4.0 CONCLUSION	23
5.	5.0 REFENCE	23

1.0 INTRODUCTION

Our Cat Symptoms Checker (CSC) is an expert system that developed for inquiring and determine to sickness and symptoms by cat owners. CSC will briefly describe the symptoms and illness of the cat where the expert system is deployed in the CSC application. The CSC allow cat owner to determine the sickness of the cat so that they can take precaution early and determine the seriousness of the disease.

Common cat diseases include cancer, diabetes, feline immunodeficiency virus (FIV), heartworm, etc. This system provided the diagnosis method and symptoms to the owner. The system will display common symptoms of a cat's disease and the owner will have to answer whether the symptoms occur as they would to a doctor.

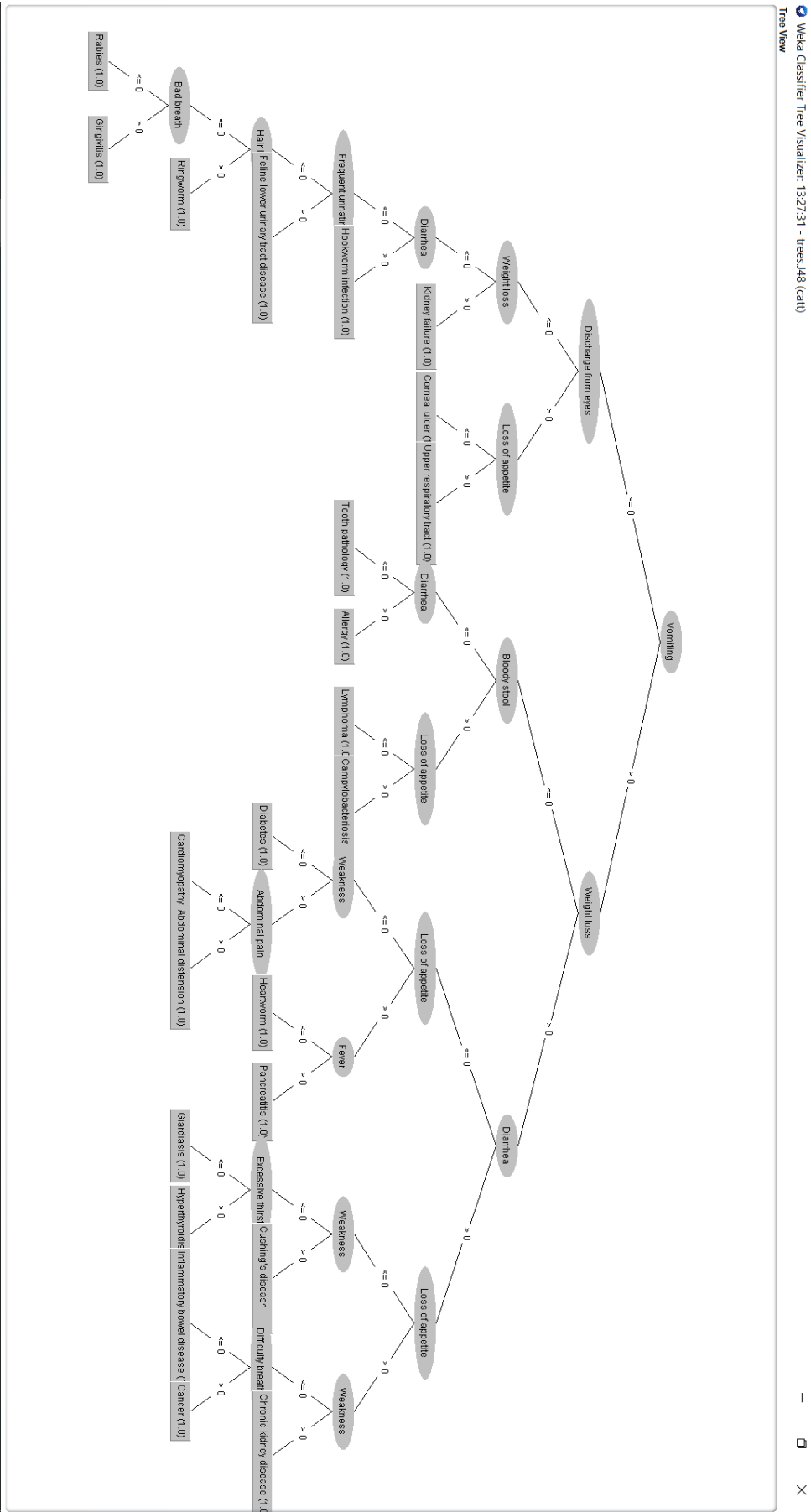
The system will gather all the symptoms and return a medical diagnosis. The illness checking system not only help to keep the cat healthy but also to protect the owner from zoonotic diseases which can be transmitted between cats and people. The disease can be transmitted via contact with an infected cat's faces or saliva.

2.0 KNOWLEDGE REPRESENTATION

2.1 TABLE:

Cat Symptoms Checker	
Symptoms (S)	Disease (D)
S1: Vomiting	D1: Chronic kidney disease
S2: Weight loss	D2: Feline immunodeficiency virus (FIV)
S3: Diarrhea	D3: Cushing's disease
S4: Loss of appetite	D4: Allergy
S5: Weakness	D5: Upper respiratory tract
S6: Difficulty breathing	D6: Cancer
S7: Excessive thirst	D7: Heartworm
S8: Coughing	D8: Campylobacteriosis
S9: Frequent urinating	D9: Cardiomyopathy
S10: Hair loss	D10: Abdominal distension
S11: Discharge from eyes	D11: Lymphoma
S12: Constipation	D12: Diabetes
S13: Bad breath	D13: Inflammatory bowel disease
S14: Sneezing	D14: Hyperthyroidism
S15: Increase in appetite	D15: Corneal ulcer
S16: Swollen abdomen	D16: Ringworm
S17: Bloody urine	D17: Pancreatitis
S18: Inflammation of eyes	D18: Hookworm infection
S19: Watery eyes	D19: Tooth pathology
S20: Seizure	D20: Feline lower urinary tract disease
S21: Bloody stool	D21: Giardiasis
S22: Drooling	D22: Rabies
S23: Itchy	D23: Kidney failure
S24: Redness skin	D24: Gingivitis
S25: Urinating small amount	
S26: Straining to urinate	
S27: Dandruff	
S28: Unexplained bleeding from body	
S29: Curled ear tips	
S30: Sensitive to light	
S31: Clouded cornea	
S32: Head tilting	
S33: Dark stool	
S34: Watery stool	
S35: Swollen paws	
S36: Difficulty walking	
S37: Wheezing	
S38: Mouth bleeding	
S39: Mouth ulcers	
S40: Brownish colored tongue	
S41: Snoring	
S42: Runny nose	
S43: Fragile skin	

2.2 DECISION TREE



2.3 DECISION TABLE

	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 1 0	D 1 1	D 1 2	D 1 3	D 1 4	D 1 5	D 1 6	D 1 7	D 1 8	D 1 9	D 2 0	D 2 1	D 2 2	D 2 3	D 2 4
S 1	1		1	1		1	1	1	1	1	1	1	1	1			1		1		1			
S 2	1	1	1			1	1		1	1		1	1	1			1				1		1	
S 3	1	1	1	1		1		1			1		1	1				1			1			
S 4	1	1			1	1	1	1					1				1							
S 5	1		1						1	1														
S 6					1	1			1	1														
S 7	1		1									1		1										
S 8				1	1	1	1																	
S 9	1	1																		1				
S 1 0		1	1													1								
S 1 1		1			1										1									
S 1 2	1										1							1						
S 1 3	1																		1				1	
S 1 4		1		1	1																			
S 1 5			1									1												
S 1 6			1						1															
S 1 7	1																			1				

S 1 8		1												1									
S 1 9				1	1																		
S 2 0							1															1	
S 2 1								1			1												
S 2 2																	1				1		
S 2 3				1											1								
S 2 4		1													1								
S 2 5																		1					
S 2 6		1																					
S 2 7															1								
S 2 8						1																	
S 2 9			1																				
S 3 0														1									
S 3 1														1									
S 3 2																					1		
S 3 3																	1						

S 3 4								1																
S 3 5				1																				
S 3 6								1																
S 3 7				1																				
S 3 8																								1
S 3 9	1																							
S 4 0	1																							
S 4 1				1																				
S 4 2					1																			
S 4 3			1																					

* '1' mean the disease have the symptom.

2.4 TREATMENT TABLE

NO	DISEASE	TREATMENT
1	Chronic kidney disease	<ul style="list-style-type: none"> a. Medications to lower blood pressure (e.g., propranolol, atenolol, or enalapril) b. Nutritional supplements that reduce BUN (Azodyl) and phosphorus levels (Epakitin) c. Omega 3 fatty acids to protect the kidneys d. Medications to treat or prevent stomach ulcers (e.g., ranitidine, famotidine, omeprazole, sucralfate) e. Potassium supplements f. Medications decrease blood phosphorous levels (e.g., calcium carbonate) g. Calcitriol to slow the progression of chronic renal failure h. Medications to treat anemia (e.g., erythropoietin or darbepoetin) i. Anti-nausea medications (e.g., maropitant or ondansetron)
2	Feline immunodeficiency virus (FIV)	<ul style="list-style-type: none"> a. Medication for secondary infections b. Healthy, palatable diet to encourage good nutrition c. Fluid and electrolyte replacement therapy d. Anti-inflammatory drugs e. Immune-enhancing drugs f. Parasite control.
3	Cushing's disease	<ul style="list-style-type: none"> a. The treatment options for cats with Cushing's disease are fairly limited.
4	Allergy	<ul style="list-style-type: none"> a. <u>antihistamines</u>, such as <u>diphenhydramine</u> (Benadryl), <u>loratadine</u> (Claritin) or <u>cetirizine</u> (Zyrtec) b. corticosteroid nasal sprays such as <u>fluticasone</u> (Flonase) or <u>mometasone</u> (Nasonex) c. over-the-counter <u>decongestant sprays</u> d. <u>cromolyn sodium</u>, which prevents the release of immune system chemicals and may reduce symptoms e. leukotriene inhibitors, such as <u>montelukast</u> (Singulair) f. <u>allergy shots</u> known as immunotherapy (a series of shots that desensitize you to an allergen)
5	Upper respiratory tract	<ul style="list-style-type: none"> a. antibiotics
6	Cancer	<ul style="list-style-type: none"> a. Surgery- removing lump or bump b. Chemotherapy c. radiation therapy

7	Heartworm	<ul style="list-style-type: none"> a. Unfortunately, there is no approved drug therapy for heartworm infection in cats
8	Campylobacteriosis	<ul style="list-style-type: none"> a. Antibiotics to treat the infection. b. Fluids to replace lost fluids. c. A bland diet to rest the stomach while your cat recovers. d. Isolate the affected cats from other pets to reduce transmission
9	Cardiomyopathy	<ul style="list-style-type: none"> a. Diltiazim to slow the heart rate, treat irregular heart beats, and possibly reduce the enlargement in the left ventricle b. Beta blockers to slow the heart rate, correct irregular heart beats, and control blockage of the blood flow. These are not used if the cat has congestive heart failure c. Ace inhibitors, in cases with congestive heart failure, to improve the flow through the ventricle d. Aspirin to decrease risk of blood clots e. Warfarin to prevent blood clotting f. Furosemide (diuretic) to remove excess fluid from the body g. Spironolactone (a diuretic used sometimes in conjunction with furosemide) for cats with congestive heart failure h. Nitroglycerin ointment, to improve flow by dilating (opening) the ventricle and arteries
10	Abdominal distension	<ul style="list-style-type: none"> a. Abdominocentesis b. Diuretics c. Surgical removal d. Antibiotics
11	Lymphoma	<ul style="list-style-type: none"> a. Chemotherapy b. Surgery
12	Diabetes	<ul style="list-style-type: none"> a. Insulin injections b. Oral hypoglycemic medications c. Diet
13	Inflammatory bowel disease	<ul style="list-style-type: none"> a. Dietary therapy b. Corticosteroids
14	Hyperthyroidism	<ul style="list-style-type: none"> a. Antithyroid medication b. Surgical removal of thyroid gland c. Radioactive iodine therapy

15	Corneal ulcer	<ul style="list-style-type: none"> a. Antibiotic eye ointment b. Optical pain medication c. Elizabethan collar to prevent rubbing or scratching d. Chronic ulcer surgery
16	Ringworm	<ul style="list-style-type: none"> a. Ointment on affected skin b. Antifungal drug
17	Pancreatitis	<ul style="list-style-type: none"> a. Anti-inflammatory drug b. Antibiotics c. Plasma transfusion d. Surgery
18	Hookworm infection	<ul style="list-style-type: none"> a. Deworming medication b. Nutritional and iron supplements
19	Tooth pathology	a. Cleaning cat's teeth
20	Feline lower urinary tract disease	<ul style="list-style-type: none"> a. Medication b. Diet c. Stress relief
21	Giardiasis	<ul style="list-style-type: none"> a. Medical drug
22	Rabies	<ul style="list-style-type: none"> a. No treatment available, please keep your cat quarantined.
23	Kidney failure	<ul style="list-style-type: none"> a. Drugs to enhance urine production b. Therapeutic diet c. Management of electrolyte abnormalities d. Fluid therapy e. Correction of <u>anemia</u> f. Medication for high blood pressure, vomiting or gastrointestinal problems g. Dialysis h. Kidney transplant
24	Gingivitis	<ul style="list-style-type: none"> a. Cleaning cat's teeth b. Antibiotics c. Scaling of inflammation-inducing plaque from the teeth d. Immunosuppressive drug

3.0 INFERENCE ENGINE

3.1 RULES:

1. IF Vomit
AND Weight loss
AND Diarrhea
AND Loss of appetite
AND Weakness
AND Excessive thirst
AND Frequent urinating
AND Constipation
AND Bad breath
AND Bloody urine
AND Mouth ulcers
AND Brownish colored tongue
THEN Chronic Kidney disease
2. IF Weight loss
AND Diarrhea
AND Loss of appetite
AND Frequent urinating
AND Hair loss
AND Discharge from eyes
AND Sneezing
AND Inflammation of eyes
AND Redness skin
AND Straining to urinate
THEN Feline immunodeficiency virus (FIV)
3. IF Vomiting
AND Weight loss
AND Diarrhea
AND Weakness
AND Excessive thirst
AND Hair loss
AND Increase in appetite
AND Swollen abdomen
AND Curled ear tips
AND Fragile skin
THEN Cushing's disease
4. IF Vomiting
AND Diarrhea
AND Coughing
AND Sneezing
AND Watery eyes
AND Itchy

AND Swollen paws
AND Wheezing
AND Snoring
THEN Allergy

5. IF Loss of appetite
AND Difficulty breathing
AND Coughing
AND Discharge from eyes
AND Sneezing
AND Watery eyes
AND Runny nose
THEN Upper respiratory tract
6. IF Vomiting
AND Weight loss
AND Diarrhea
AND Loss of appetite
AND Difficulty breathing
AND Coughing
AND Unexplained bleeding from body
THEN Cancer
7. IF Vomiting
AND Weight loss
AND Loss of appetite
AND Coughing
AND Seizure
AND Difficulty walking
THEN Heartworm
8. IF Vomiting
AND Diarrhea
AND Loss of appetite
AND Bloody stool
AND Watery stool
THEN Campylobacteriosis
9. IF Vomiting
AND Weight loss
AND Weakness
AND Difficulty breathing
AND Swollen abdomen
THEN Cardiomyopathy

- 10. IF Vomiting
AND Weight loss
AND Weakness
AND Difficulty breathing
THEN Abdominal distension

- 11. IF Vomiting
AND Diarrhea
AND Constipation
AND Bloody stool
THEN Lymphoma

- 12. IF Vomiting
AND Weight loss
AND Excessive thirst
AND Increase in appetite
THEN Diabetes

- 13. IF Vomiting
AND Weight loss
AND Diarrhea
AND Loss of appetite
THEN Inflammatory bowel disease

- 14. IF Vomiting
AND Weight loss
AND Diarrhea
AND Excessive thirst
THEN Hyperthyroidism

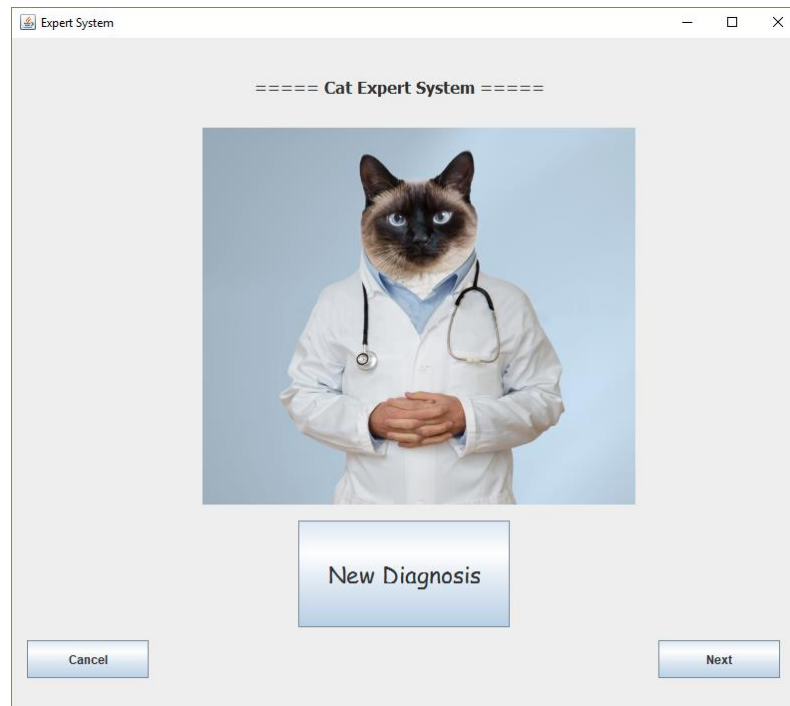
- 15. IF Discharge from eyes
AND Inflammation of eyes
AND Sensitive to light
AND Clouded cornea
THEN Corneal ulcer

- 16. IF Hair loss
AND Itchy
AND Redness skin
AND Dandruff
THEN Ringworm

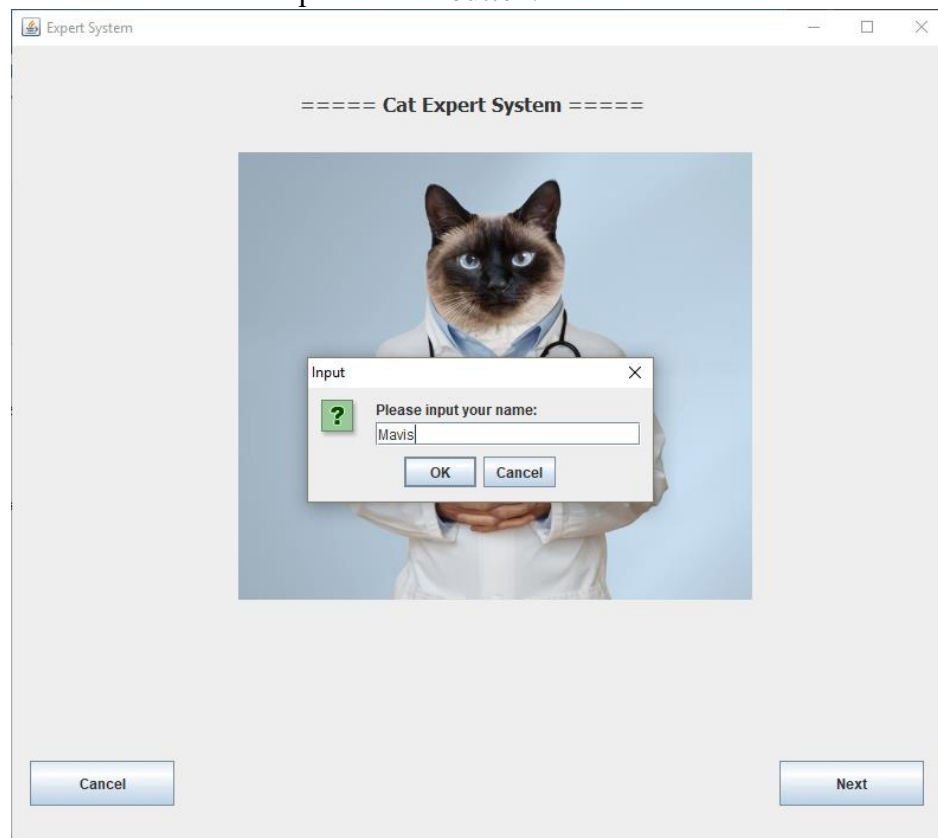
17. IF Vomiting
AND Weight loss
AND Loss of appetite
THEN Pancreatitis
18. IF Diarrhea
AND Constipation
AND Dark stool
THEN Hookworm infection
19. IF Vomiting
AND Bad breath
AND Drooling
THEN Tooth pathology
20. IF Frequent urinating
AND Bloody urine
AND Urinating small amount
THEN Feline lower urinary tract disease
21. IF Vomiting
AND Weight loss
AND Diarrhea
THEN Giardiasis
22. IF Drooling
AND Head tilting
THEN Rabies
23. IF Weight loss
AND Seizure
THEN Kidney failure
24. IF Bad breath
AND Mouth bleeding
THEN Gingivitis

3.2 INTERFACE

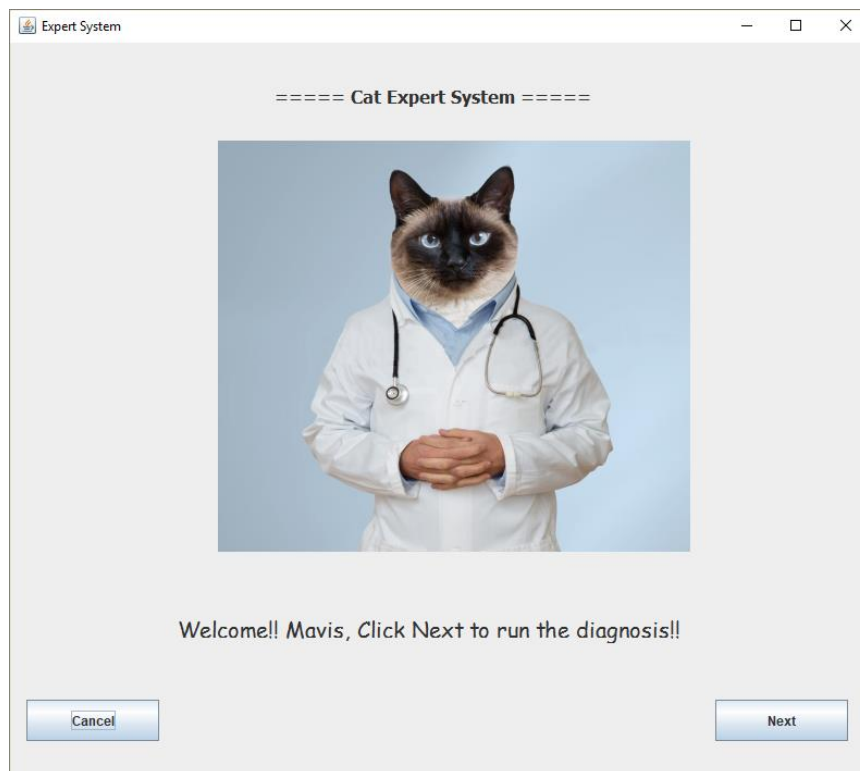
1. Press the button 'New Diagnosis' to start the system.



2. User need to enter his/her name and press 'OK' button.



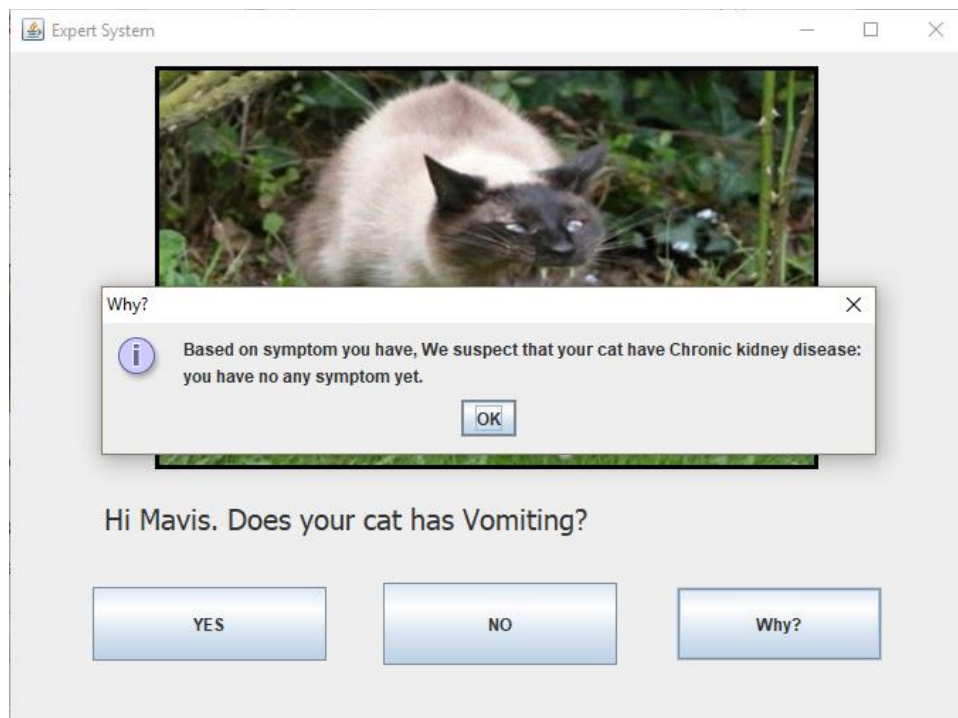
3. User need to press 'Next' to run the diagnosis.



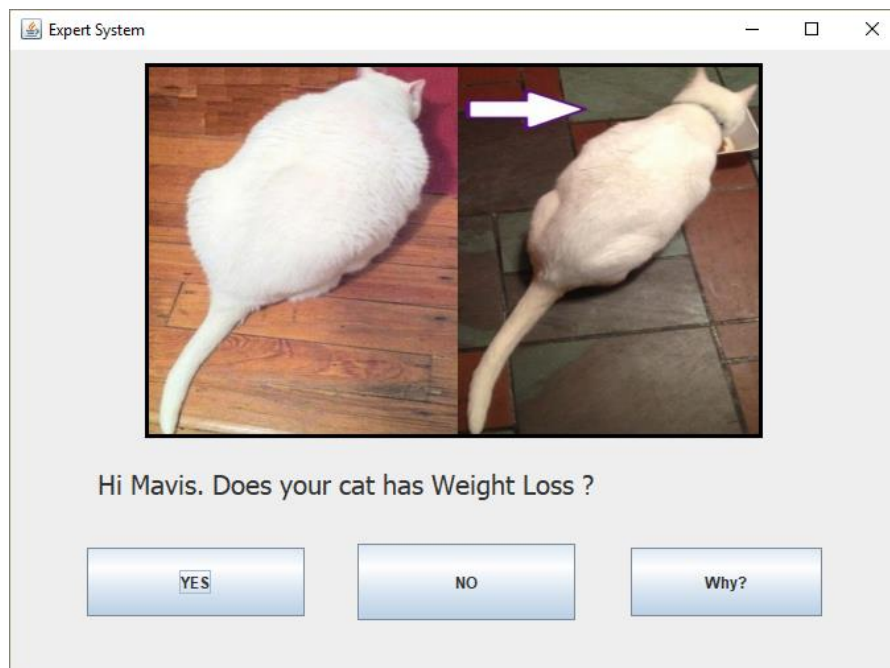
4. After that, the diagnosis process will start. Based on the question asking, user need to press 'YES' if their cat has that symptom or press 'NO' if their cat does not have that symptom. The button 'Why?' is to tell the user that cat disease suspected by the system based on the symptoms.



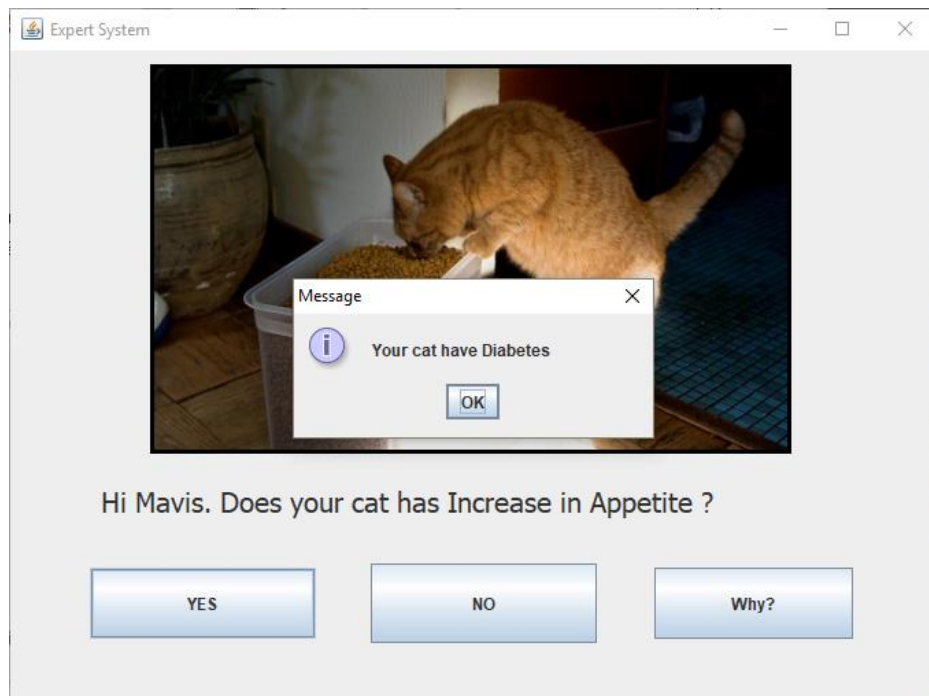
5. When the button 'Why?' been pressed, the message dialog will appear and tell the user that the cat disease suspected by the system. Next, press the button 'OK' to continue.



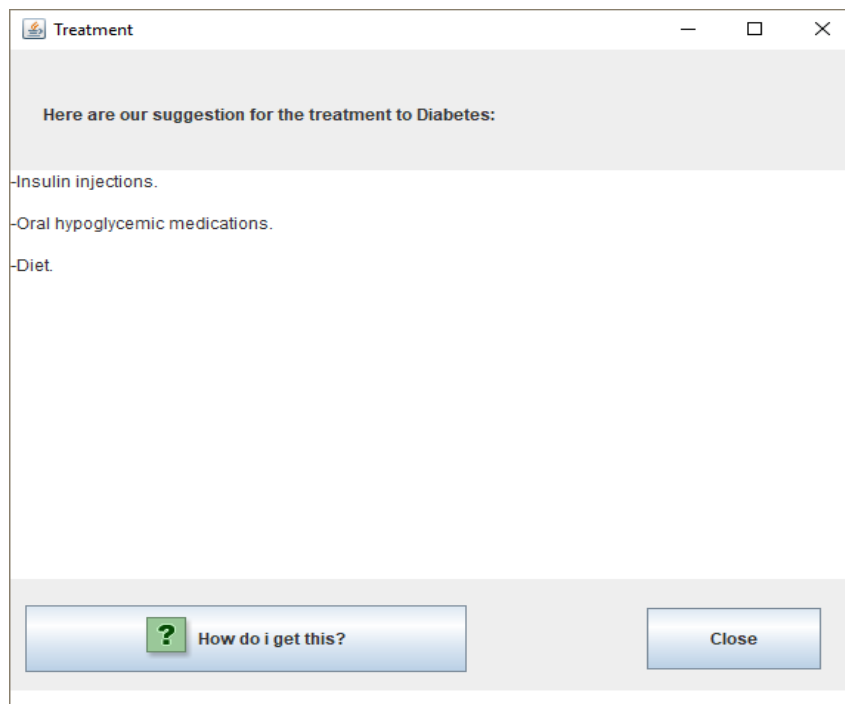
6. The system will continue asking question after the user press the button 'YES' or the button 'NO' until the system show the result.



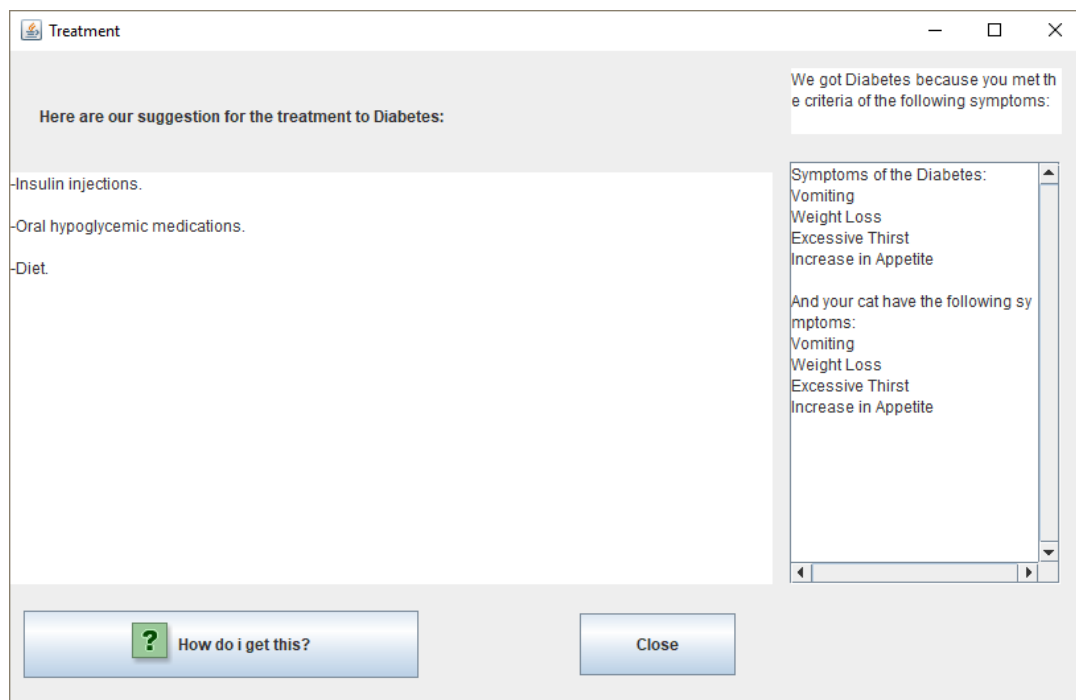
7. After the user press the button 'YES' or button 'NO' for several times in order to answer the question, a message dialog will appear to tell the user what their cat's disease. Next, press the button 'OK' to continue.



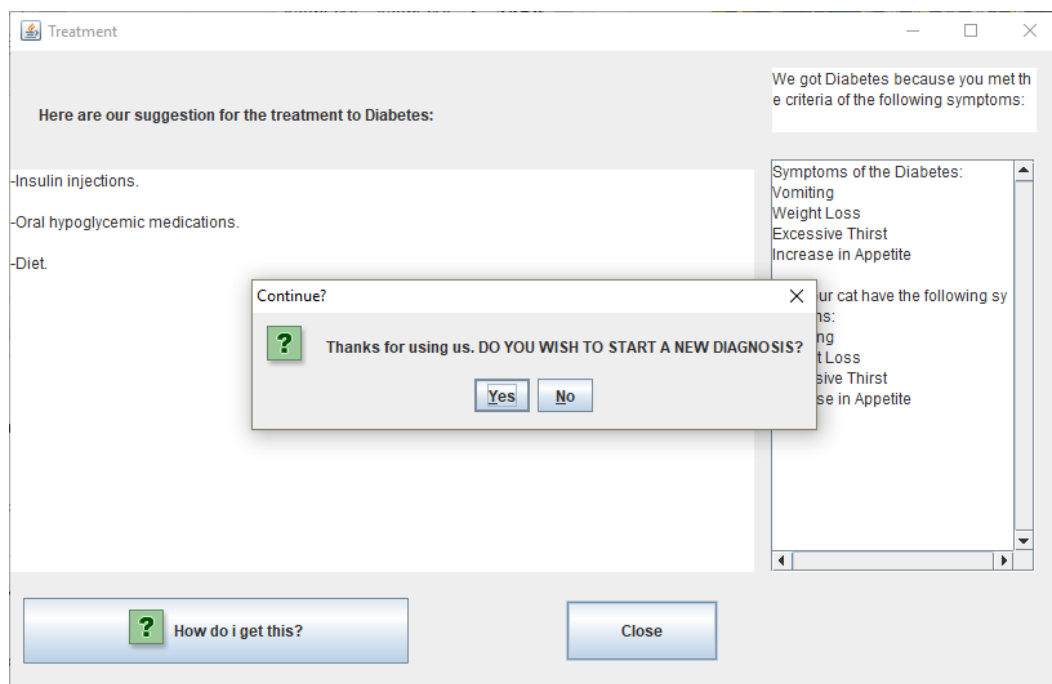
8. After the user press the button 'OK', a Treatment interface will appear to suggest some treatment based on the cat disease.



9. When the user press button 'How do I get this?' another column will appear in the Treatment interface in order to explain how the system get the disease based on the symptoms.



10. By clicking on 'Close' button, a message dialog will appear to ask the user either want to start a new diagnosis or not. User need to press the button 'Yes' if they wish to start a new diagnosis or press 'No' if they wish to exit the system.



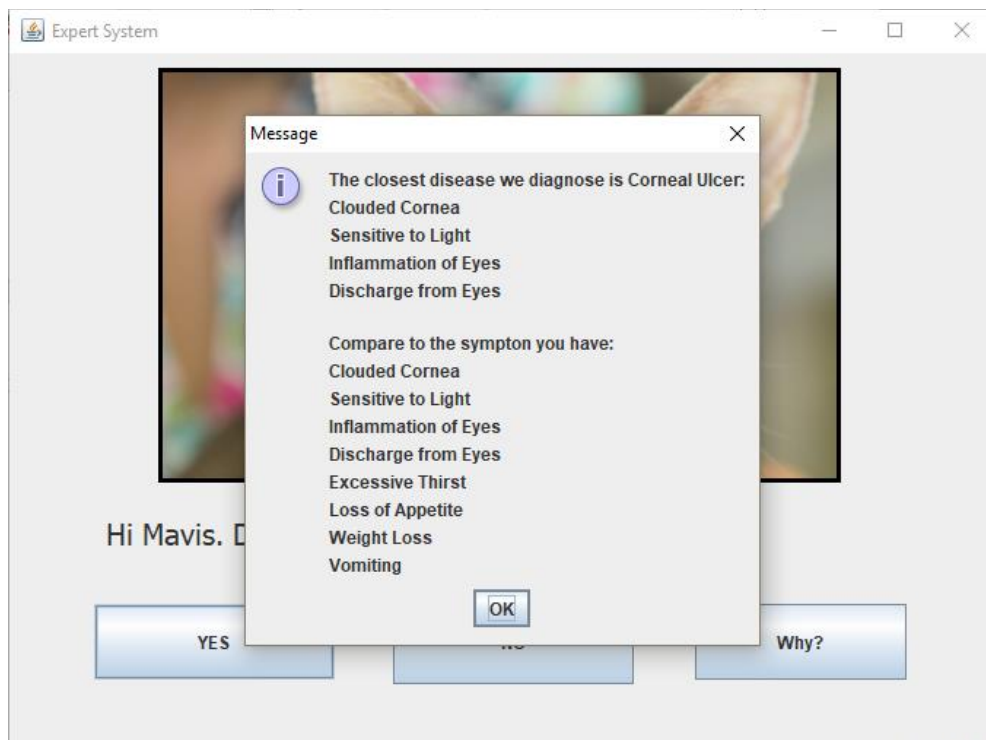
11. If the system cannot diagnose a disease, it will appear an undiagnosed message dialog. Next, press the button 'OK' to continue.



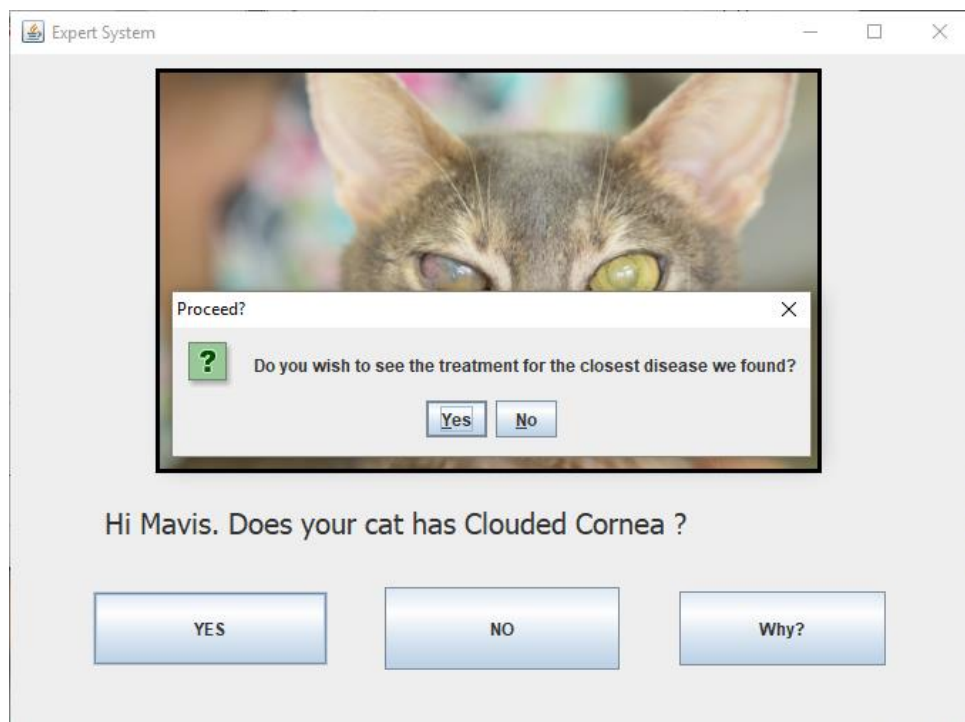
12. After that, a message dialog will appear to ask the user either want to start a new diagnosis or not. User need to press the button 'Yes' if they wish to start a new diagnosis or press 'No' if they wish to exit the system.



13. Sometimes, the system will shows the closest disease based on the symptoms given by the user.
Next, press the button 'OK' to continue.



14. After the system shows the closest disease, a message dialog will appear. User need to press 'Yes' to see the treatment for that closest disease or press 'No' to exit.



3.3 FORWARD CHAINING AND BACKWARD CHAINING

In this system, we are using both forward chaining and backward chaining. Our system asks the questions based on the answer pressed by the user, and the system will show the result based on those symptoms. This is forward chaining. Meanwhile, when the user pressed the button 'Why', our system will trace back those symptoms in order to show the suspected disease. This is backward chaining.

4.0 CONCLUSION

Our Cat Symptoms Checker (CSC) is an expert system that allow cat owner to diagnose their cat disease just by refer to their cat's symptoms. By using this system, the cat owner can determine the sickness of the cat so that they can take precaution early and determine the seriousness of the disease. This system is a user friendly system which is easy to understand and easy to use. The system was provided the sample photo for all cat symptoms so that the cat owner can easily recognize their cat's symptoms. Moreover, the treatment will also be provided in order to help the cat owner's cat to cure from the cat disease.

5.0 REFERENCE

1. NUR IDAYU BINTI SAMAT (2010). CHECKING CAT DISEASES SYMPTOMS SYSTEM USING RULE-BASED TECHNIQUE. Retrieved from http://umpir.ump.edu.my/2631/1/NUR_IDAYU_BINTI_SAMAT.PDF
2. Eka-Setyarini, Darma-Putra² and Adi-Purnawan (2013). *The Analysis of Comparison of Expert System of Diagnosing Dog Disease by Certainty Factor Method and Dempster-Shafer Method*. Retrieved from <https://ijcsi.org/papers/IJCSI-10-1-2-576-584.pdf>
3. Petmd, Llc. - petMD
<https://www.petmd.com/cat/cat-symptom-checker>
4. PetCareRx - Cat Symptom Checker: Match Your Cat's Symptoms to Health Conditions - <https://www.petcarerx.com/article/cat-symptom-checker-match-your-cats-symptoms-to-health-conditions/1553>
5. Pinterest image
<https://i.pinimg.com/736x/f9/e7/82/f9e782896392abc4549b3b023f3d76f8--cat-anatomy-cat-magazine.jpg>
6. Campylobacteriosis Infection in Cats - Symptoms, Causes, Diagnosis, Treatment, Recovery, Management, Cost
<https://wagwalking.com/cat/condition/campylobacteriosis-infectionz>