50th Year — **HACETTEPE UNIVERSITY**

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Project Name	Report Date
What Am I Eating?	01.01.2018

Supervisor(s)	Student Name(s)
Prof. Dr. Pınar DUYGULU ŞAHİN	Anıl BULUT
	Ekrem CANDEMİR
	Yunus Eren KIZILAY
	Burak YÜCEL

What Am I Eating?

- Users who want to take care of their diets due to any disease or their preferences can use this application.

- After entering the application, users select the ingredients they want to eat or do not want eat

- When users go to a restaurant; by taking a picture of the menu, they can see whether or not the meals in the menu match their preferences.

Method Followed

- Creating dataset

- Creating documents and indexing meals by using Lucene Library.

- Getting meal names on the menu by using Google Cloud Vision API

- Sending the meal names along with user preferences to Lucene web service

- Providing recommendations to the user according to the information provided by the web service

Steps (1) – Creating Dataset

- Taken recipes with software scripts from various web sites.

- However, these recipes contained rather unnecessary words. They had to

  be cleaned. For this purpose stopwords were created and used.

```
----------> 700 gram dana kıyma          ----------> 2 dilim büyük boy fileto levrek balığı
dana kıyma                               levrek
----------> 300 gram kuzu kıyma          ----------> 1/2 adet küçük boy kırmızı soğan
kuzu kıyma                               soğan
----------> 1 diş sarımsak               ----------> 4 adet cherry domates
sarımsak                                 domates
----------> 2 adet kuru soğan            ----------> 1 yemek kaşığı kapari turşusu
soğan                                    kapari turşusu
----------> 1 çay kaşığı pul biber       ----------> 2 yemek kaşığı dilimlenmiş siyah zeytin
pul biber                                siyah zeytin
----------> 1 çay kaşığı karabiber       ----------> 2 yemek kaşığı zeytinyağı
karabiber                                zeytinyağı
----------> 1 yemek kaşığı acı biber salçası ----------> 1 dal taze biberiye
biber salçası                            biberiye
```

Steps (2) – Indexing Meals With Lucene Library

- We indexed ingredients of meals, which are taken with software scripts from web site and cleaned with stopwords, with Lucene Library.

```
String[] meals={"Tas Kebabı","Soğan Halkası","Soğan Kebabı","Sinop Mantısı","Mac and Cheese","Macar Kebap","Makarna Cipsi","Makarna Salatası","Mantarlı Pilav"};
String[] shouldIngredients={"maydanoz","domates","nane"};
String[] mustNotIngredients={"sarımsak","soğan"};
recommended meals
Total Results :: 4
Meal : Makarna Salatası, Score : 10.15268 id: 1043
sebzeli makarna,konserve garnitür,kornişon turşu,dereotu,yoğurt,mayonez,zeytinyağı,nane,tuz
--------------------------
Meal : Mantarlı Pilav, Score : 9.353283 id: 1069
pirinç,tereyağı,tavuk,mantar,fıstık,tuz,maydanoz
--------------------------
Meal : Mac and Cheese, Score : 7.1071525 id: 1033
pipette,tereyağı,un,süt,hardal,yumurta,cheddar peyniri,parmesan peyniri,tuz,karabiber
--------------------------
Meal : Makarna Cipsi, Score : 7.1071525 id: 1041
farfalle makarna,mısır unu,parmesan,biber,karabiber
--------------------------
unrecommended meals
Total Results :: 5
Meal : Tas Kebabı, Score : 9.653368 id: 1622
dana eti,ayçiçek,tereyağı,soğan,sarımsak,un,havuç,patates,domates salçası,tuz,karabiber
--------------------------
Meal : Sinop Mantısı, Score : 8.405644 id: 1498
un,yumurta,tuz,un,kıyma,soğan,doğranmış maydanoz,salça,tuz,karabiber,zeytinyağı,soğan,zeytinyağı,tereyağı,biber,tuz,ceviz
--------------------------
Meal : Soğan Kebabı, Score : 8.396542 id: 1517
kıyma,tuz,soğan,biber salçası,karabiber,pul biber,nar ekşisi
--------------------------
Meal : Macar Kebap, Score : 8.251255 id: 1034
dana eti,bezelye,patates,karabiber,mısır,patlıcan,zeytinyağı,kaşar peyniri,karabiber,tuz,sarımsak,domates,tereyağı,un,süt,tuz,karabiber,muskat cevizi
--------------------------
Meal : Soğan Halkası, Score : 8.192635 id: 1516
soğan,yumurta,süt,un,mısır nişastası,kabartma tozu karbonat,tuz,karabiber,biber,ekmek galeta unu,ayçiçek
--------------------------
time to search over index: 835ms
```

Steps (3) – Taking Texts From Photos

• This is an basic optical character recognition process.

• Various image processing techniques (noise removing, grayscaling, resizing, deskewing and border removal) were applied to the photos in order to recognize Turkish characters.


HER GÜNE ÖZEL SULU YEMEK ÇEŞİTLERİ		ÇORBA ÇEŞİTLERİ	
Sebzeli Kebap	6.50₺	İşkembe Çorbası	5.00₺
Orman Kebabı	6.50₺	Kellepaça	6.00₺
Biber Dolma	6.50₺	Ezogelin Çorbası	3.00₺
Taze Fasulye	6.00₺	Mercimek Çorbası	3.00₺
Yaz Türlüsü	6.00₺	Tavuk Suyu Çorbası	3.00₺
İzmir Köfte	6.50₺	PİLAV ÇEŞİTLERİ	
Fırın Köfte	6.50₺		
Sebzeli Köfte	6.50₺	Pirinç Pilavı	3.00₺
İslim Köfte	6.50₺	Bulgur Pilavı	3.00₺
Hasanpaşa Köfte	6.50₺	Arnavut Ciğeri	7.00₺
Ekşili Köfte	6.50₺	Adınbudu Köfte	6.50₺
Kuru Fasulye	5.00₺	Izgara Köfte	7.50₺

HER GÜNE ÖZEL
ÇORBA ÇEŞİTLERİ
SULU YEMEK ÇEŞİTLERİ
Sebzeli Kebap
İşkembe Çorbası
Orman Kebabı
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Ekşili Köfte
Kuru Fasulye
Izgara Köfte

Steps (4) – Matching Meals With Ingredients

- Meals indexed with the Lucene library; are exist on a RESTFUL Web service.

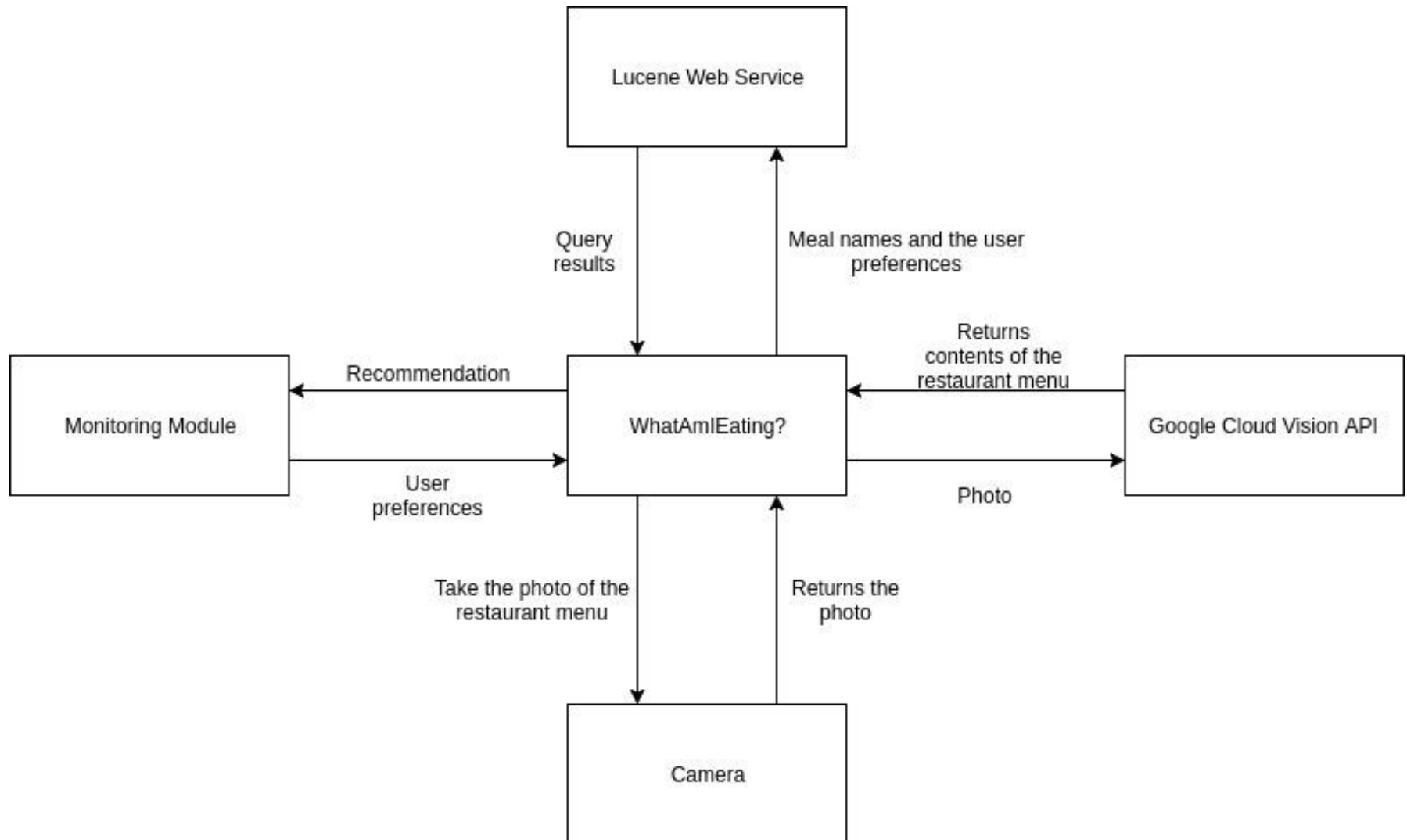- Texts, which are received with OCR, from photos taken on the Android platform; sended to this web service.
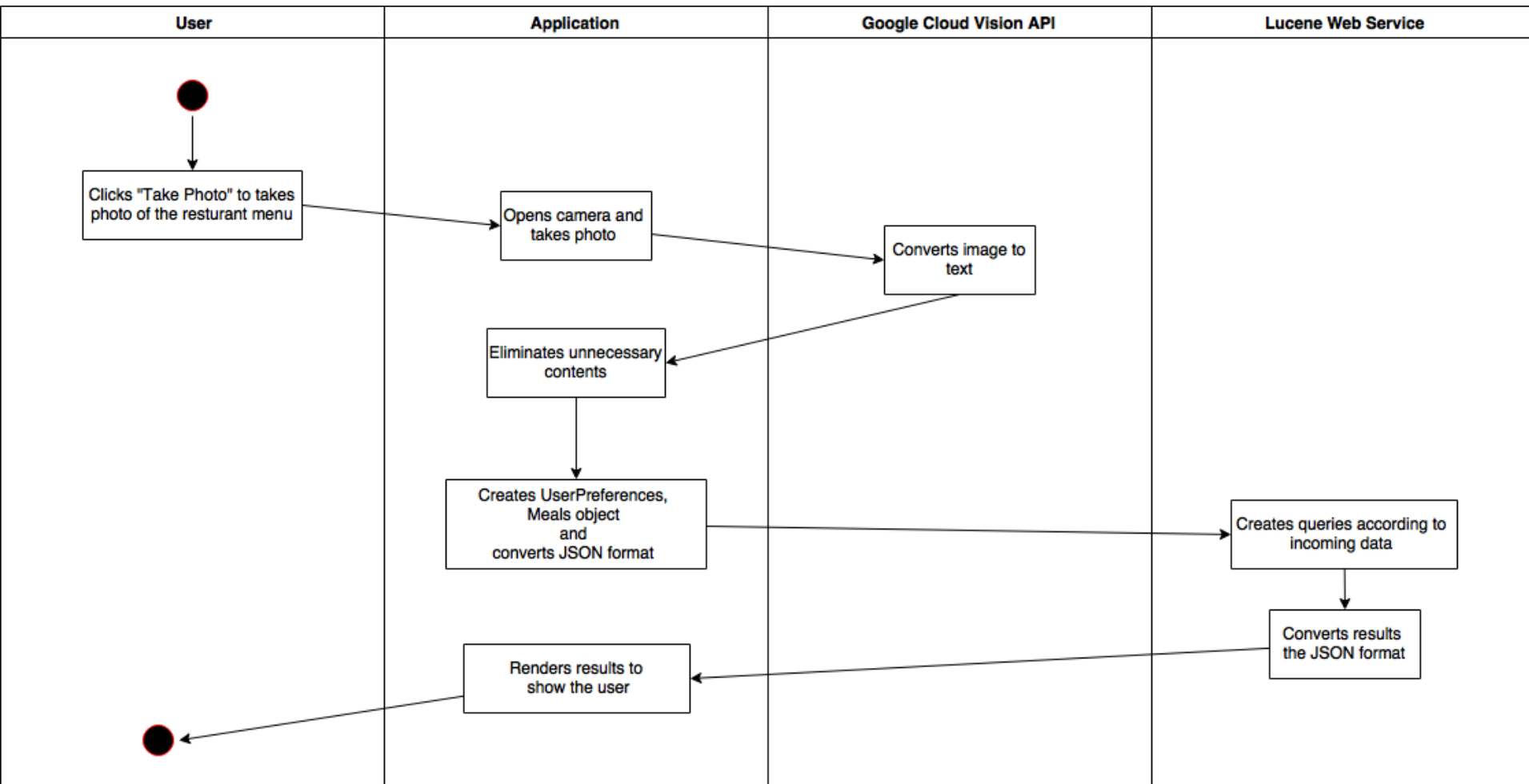
Project Overview
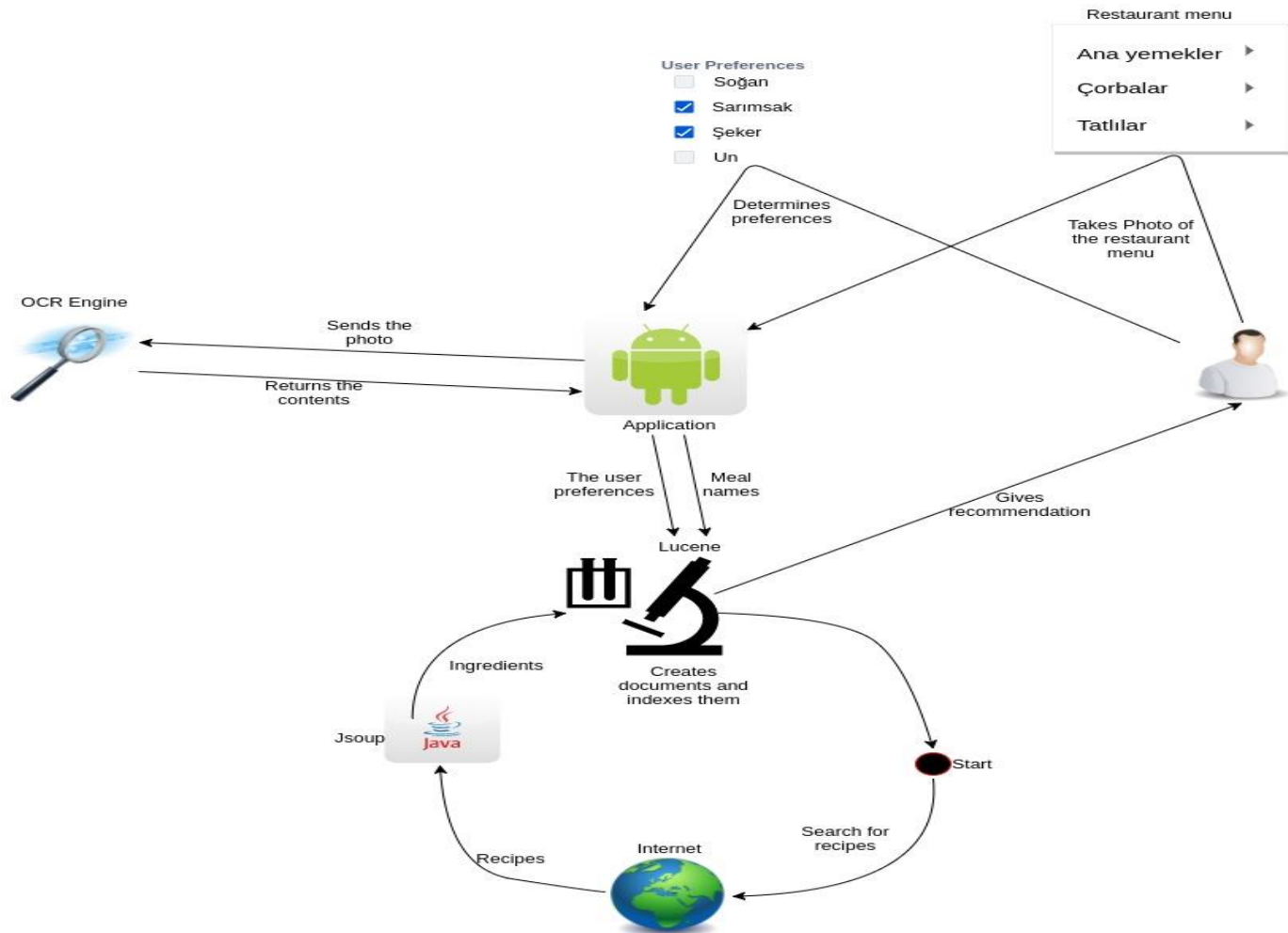
Background

- Used Google Cloud Vision API as OCR engine

- Used Lucene as information retrieval library

- Implemented a RESTful web service by using JAX-RS API

Technical Design

Operational Scenarios

User	Application	Google Cloud Vision API	Lucene Web Service
Clicks "Take Photo" to takes photo of the resturant menu	Opens camera and takes photo	Converts image to text	
	Eliminates unnecessary contents		
	Creates UserPreferences, Meals object and converts JSON format		Creates queries according to incoming data
			Converts results the JSON format
	Renders results to show the user		

Evaluation of Results

- Successful at most situations

- Could be problems due to performance of OCR Engine

- Dataset needs to expand

Contributions to Industry and Economy

It is aimed to contribute to the healthy nutrition of the users with this application. In this respect, it is aimed to decrease health problems caused by nutrition of the users and to decrease the health expenditures made by this reason.

Innovative Aspects

All of the three application in the related work section make recommendations according to the user diet or allergy. Main difference between our project and these applications is the way of getting the meal information.

In our project, meal information is obtained by the phone camera from the restaurant menu. In Fooducate application, meal information is taken from barcodes. While Fooducate application is designed for the packaged products, our project is designed for the menu items of the restaurant.

Self-Evaluation of Project Work

We consider our project work overall successful. We achieved almost all specified goals.

We realized a little late that some important design details have to change. We could have made better design choices at the beginning. We changed OCR engine from Tesseract to Google Vision API. We also decided to implement a web service to run Lucene on it, which was not planned at the beginning.

In the Android side, we couldn't get competent. We have to improve ourselves in this area.

References

[1] https://cloud.google.com/vision/

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https://jsoup.org/apidocs/overview-summary.html/

[4] https://en.wikipedia.org/wiki/Optical_character_recognition

[5] https://play.google.com/store/apps/details?id=com.fooducate.nutritionapp&hl=en

[6] https://itunes.apple.com/us/app/substitutions/id372387251

[7] https://play.google.com/store/apps/details?id=com.shopwell.shopwellandroid