DEVELOPMENT OF AN EFFICIENT PUBLIC TRANSPORT SEARCH PORTAL FOR GHANA

ENOCK SETH NYAMADOR
SUPERVISED BY DR HAMIDU ABDEL-FATAO

COMPUTER SCIENCE AND ENGINEERING DEPARTMENT
UNIVERSITY OF MINES AND TECHNOLOGY

April 17, 2018

OVERVIEW

PROBLEM DEFINITION

- Road transport is the major means of transportation in Ghana (AIDOO et al., 2013)
- Over 95% of all passenger and freight traffic and about 97% of all passenger miles in Ghana is by road (UNESCO, 2010)
- Privately owned or corporate taxis, *tro tros* (shared minivans), buses commuting between major cities (Abane, 2011)
- Difficulty in finding terminals specific location and detailed information
- Fares and stations keep changing

PROBLEM DEFINITION (CONT'D)

Figure 1: Kaneshie Transport Terminal

STATE OF PUBLIC TRANSPORT IN GHANA - PROBLEM DEFINITION (CONT'D)

- ⋆ The transport industry is currently dominated by the informal sector which provides about 90% of transport services but their services are unreliable and uncomfortable Bonaventura (2015)

- ⋆ Individually or privately operated transport services are members of unions or associations. These unions and associations serve as regulatory and mouth-piece to each of their members (Fouracre et al., 1994)

PROJECT OBJECTIVES

- ⋆ To develop a web application that provides detailed information about public transport routes in Ghana

TOOLS USED

- ⋆ Python
- ⋆ Django
- ⋆ Material Kit
- ⋆ PostgreSQL
- ⋆ QGIS
- ⋆ Leaflet and OpenStreetMap
- ⋆ GPS receiver and Smartphone

METHODOLOGY

* Review of related literature
* Conducting feasibility studies
* Requirements gathering and Analysis
* Functional and non-functional requirements
* Data Collection

REVIEW OF RELATED LITERATURE

- Neumann et al. (2015) have developed the first minibus supply model based on demand and street network only in South Africa; leading to Taximap: a public transport search web portal

CONDUCTING FEASIBILITY STUDIES

Areas Considered:

- Technical feasibility.
- Resource feasibility.
- Operational feasibility.
- Schedule feasibility.

REQUIREMENTS GATHERING AND ANALYSIS

Answers to these questions must be provided to ensure that the system can thrive:

- ⋆ Where is the system going to be used?
- ⋆ Who is going to use the system?
- ⋆ What data should be input into the system?
- ⋆ What Software Development Life Cycle(SDLC) model to be used?
- ⋆ What type of output information will the system give?

REQUIREMENTS GATHERING AND ANALYSIS

Answers to these questions must be provided to ensure that the system can thrive:

- ⋆ Where is the system going to be used?
- ⋆ Who is going to use the system?
- ⋆ What data should be input into the system?
- ⋆ What Software Development Life Cycle(SDLC) model to be used?
- ⋆ What type of output information will the system give?

REQUIREMENTS GATHERING AND ANALYSIS

Answers to these questions must be provided to ensure that the system can thrive:

- ⋆ Where is the system going to be used?
- ⋆ Who is going to use the system?
- ⋆ What data should be input into the system?
- ⋆ What Software Development Life Cycle(SDLC) model to be used?
- ⋆ What type of output information will the system give?

REQUIREMENTS GATHERING AND ANALYSIS

Answers to these questions must be provided to ensure that the system can thrive:

- ⋆ Where is the system going to be used?
- ⋆ Who is going to use the system?
- ⋆ What data should be input into the system?
- ⋆ What Software Development Life Cycle(SDLC) model to be used?
- ⋆ What type of output information will the system give?

REQUIREMENTS GATHERING AND ANALYSIS

Answers to these questions must be provided to ensure that the system can thrive:

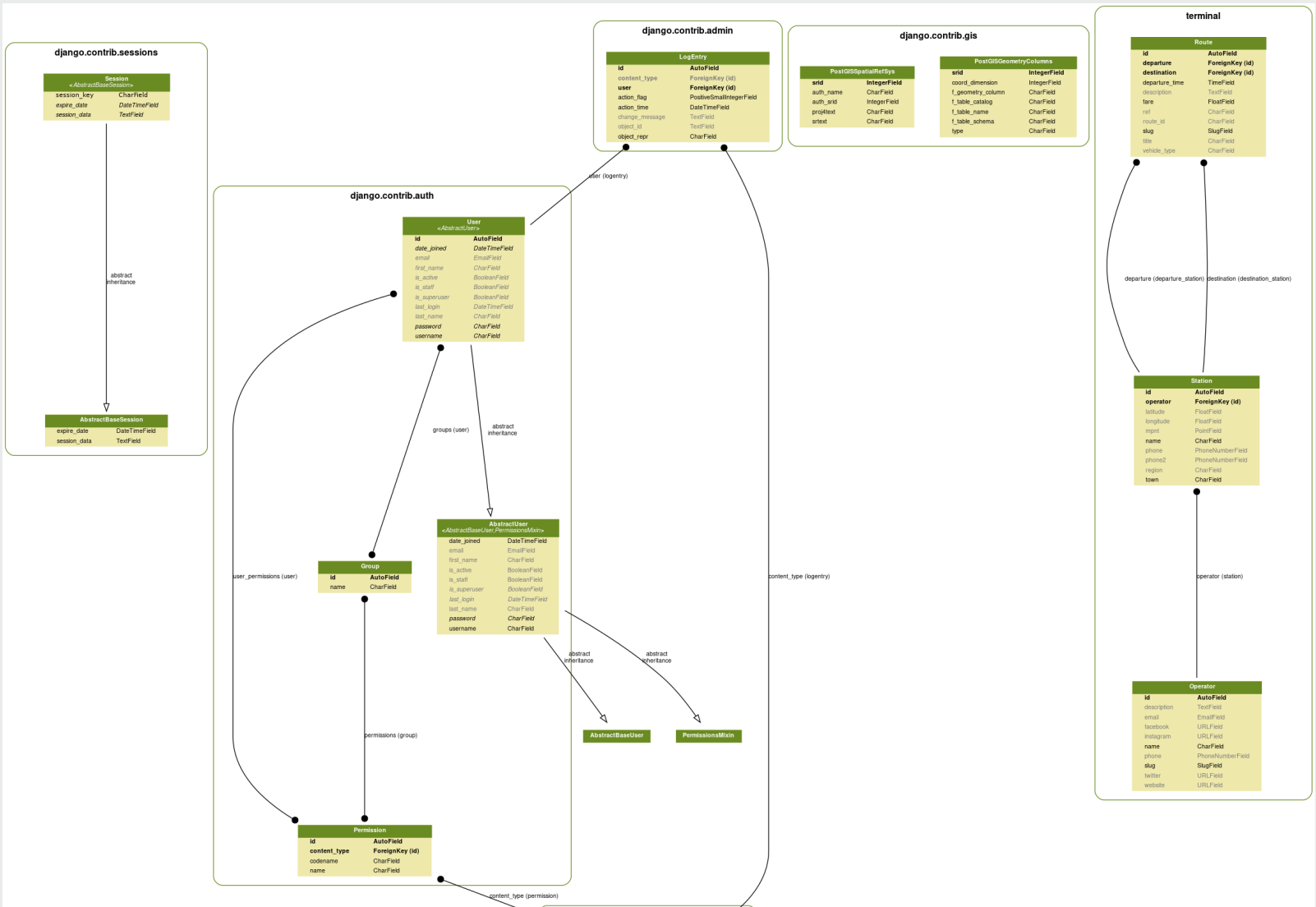
- ⋆ Where is the system going to be used?
- ⋆ Who is going to use the system?
- ⋆ What data should be input into the system?
- ⋆ What Software Development Life Cycle(SDLC) model to be used?
- ⋆ What type of output information will the system give?

DATA COLLECTION

* Field survey
* OpenStreetMap
* Crowd sourcing

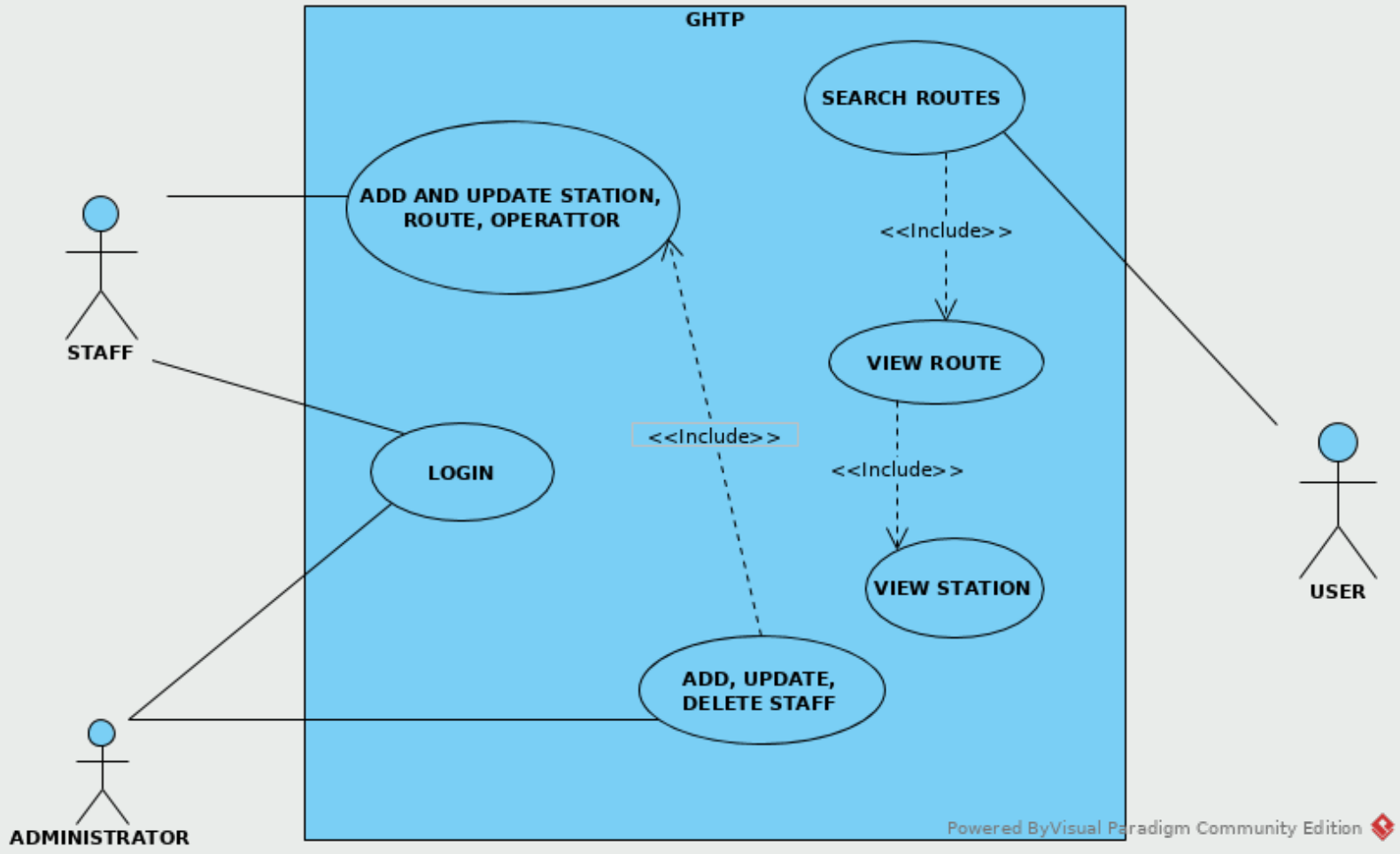
FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

Figure 2: Class Diagram



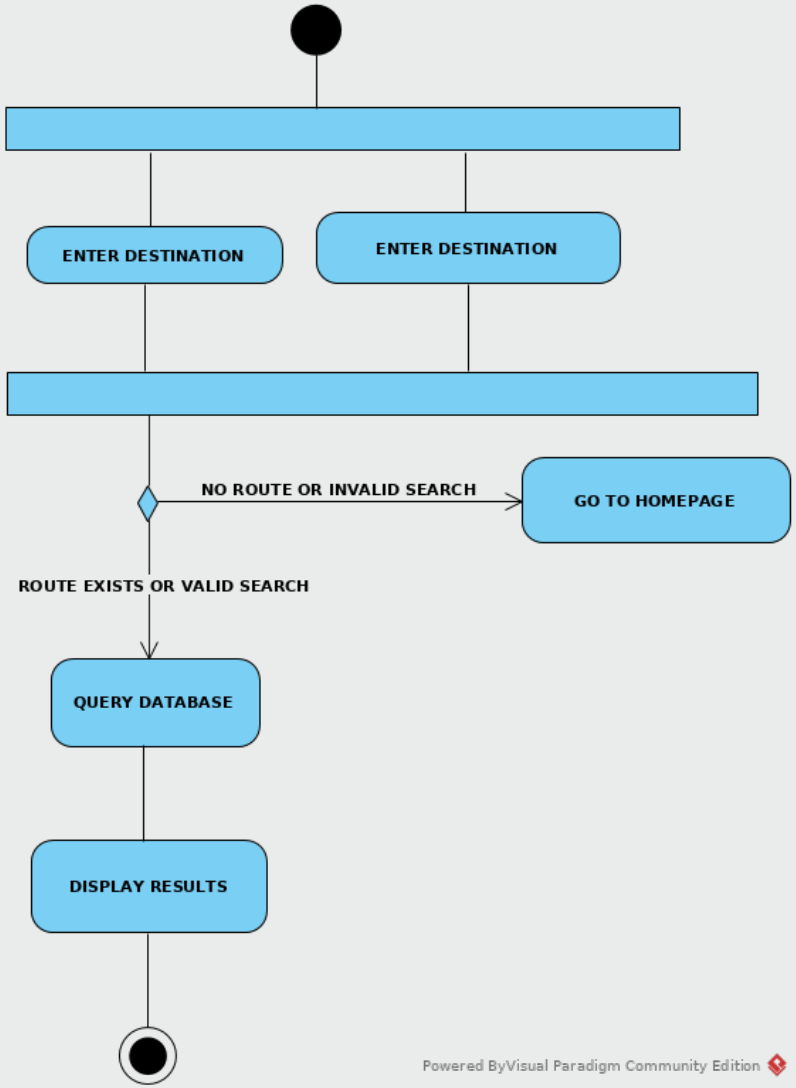
FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

Figure 3: Use Case Diagram



FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

Figure 4: Activity Diagram



RESULTS AND DISCUSSIONS

The results and discussions:

- ⋆ User gets routes based on destination and departure searched
- ⋆ A user can access all available operators and view detailed information on each station
- ⋆ User can compare fares visually
- ⋆ A user is able to access station location in external platform
- ⋆ Groups for managing staff privileges
- ⋆ Detailed history of changes available in administration dashboard

DEMONSTRATION

GHTP

CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that this system:

- ⋆ Will improve trip planning and easy access to information only available within terminals to traveler hence saving time
- ⋆ Should be adopted by Ghana Tourism Authority to help tourists find their way around Ghana transport network

I would recommend that:

- ⋆ Users should be able to book seats from the platform and also support voice input for the visually impaired
- ⋆ The system could get users current location and find nearest possible departure stations for their routes

CONCLUSIONS AND RECOMMENDATIONS

It can be concluded that this system:

- ⋆ Will improve trip planning and easy access to information only available within terminals to traveler hence saving time
- ⋆ Should be adopted by Ghana Tourism Authority to help tourists find their way around Ghana transport network

I would recommend that:

- ⋆ Users should be able to book seats from the platform and also support voice input for the visually impaired
- ⋆ The system could get users current location and find nearest possible departure stations for their routes

REFERENCES

Abane, A. M. (2011), 'Travel behaviour in ghana: Empirical observations from four metropolitan areas', *Journal of Transport Geography* **19**(2), 313–322.

AIDOO, E. N., AGYEMANG, W., MONKAH, J. E. and AFUKAAR, F. K. (2013), 'PASSENGER's SATISFACTION WITH PUBLIC BUS TRANSPORT SERVICES IN GHANA:: A CASE STUDY OF KUMASI–2013;ACCRA ROUTE', **8**(2), 33–44.

Bonaventura, A. (2015), 'Assessment of customers' satisfaction from large buses services in urban public transportation a case of ubungo bus terminal'.

Fouracre, P., Kwakye, E., Okyere, J. and Silcock, D. (1994), 'Public transport in ghanaian cities — a case of union power', *Transport Reviews* **14**(1), 45–61.

Neumann, A., Röder, D. and Joubert, J. W. (2015), 'Toward a simulation of minibuses in south africa', **8**(1), 137–154. **URL:** *http://www.jstor.org/stable/26202706*

UNESCO (2010), 'Ghana and unesco annual magazine'.

THANK YOU