



UNIVERSITY OF  
CALGARY

# Virtual Reality Solution

**Implementing VR to Support Medic Mobile's  
Community Health Workers**

Adly Azim, Raisa Chowdhury, Irene Daniel, Alhedo Goc, and Shanna Hollingworth

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# Meet the Team



Adly Azim  
Biological Sciences



Raisa Chowdhury  
Business Analytics &  
Data Science



Irene Daniel  
Health Sciences



Alhedo Goc  
Biological Sciences



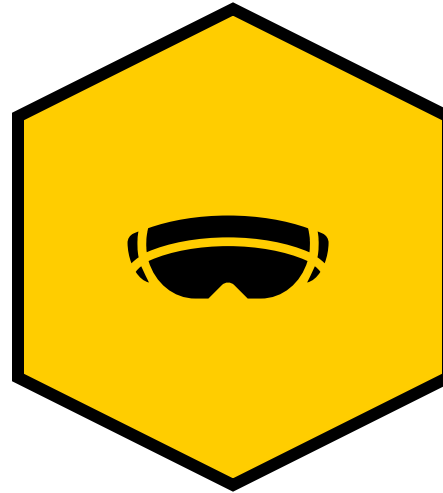
Shanna Hollingworth  
Computer Science &  
Data Science/Mandarin

# Project Purpose



## Task

*Utilize VR technologies to support Medic Mobile's operations; incorporate projects completed by other task groups where relevant*



## Solution

*Implemented VR solution to visualize roads of Mzuzu, combined with AI traffic generator*



## Impact

*Support Medic Mobile to better navigate the communities it serves; effectively enhancing the quality of support*

# Literature Review

## Virtual Reality

### Approach

What is VR? How does it work?  
What applications does it have?  
What are the potential drawbacks  
of the technology?

### Findings

Various applications in the medical  
field, especially relating to training  
VR demos are an often slow,  
isolating, and inflexible  
experience<sup>1-3</sup>

## Maternal Health

What existing maternal health  
challenges are being faced by  
communities of Malawi?

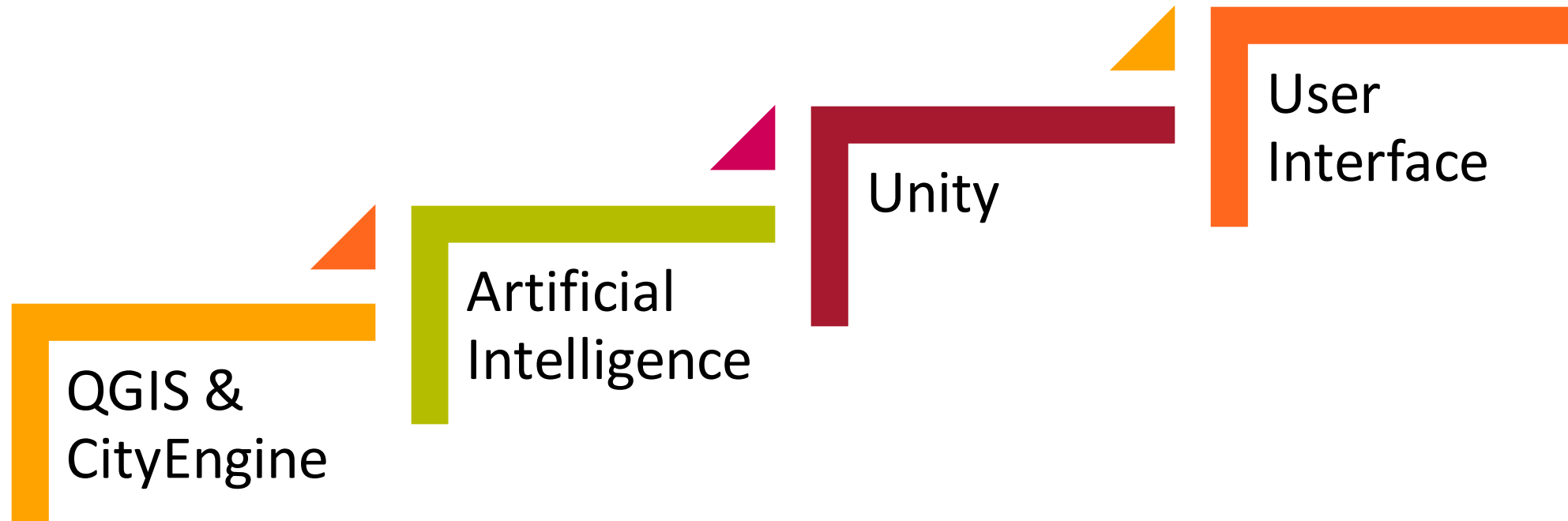
Long distances required to travel  
for health services, poorly trained  
healthcare staff, and delays in  
receiving care<sup>4-7</sup>

## Intersection

What potential applications does  
VR have in maternal health?  
Which of these applications have  
the most promise for our project?

VR can be used to support mothers  
through empathy-building  
activities, virtual visitation, health  
monitoring, and exercise  
training<sup>8-10</sup>

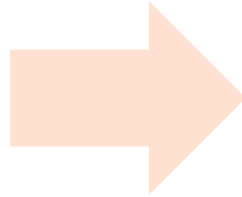
# Project Methodology





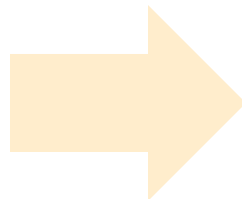
# Using QGIS and CityEngine to Create Map Data

## Terrain and Landscape



- Used a combination of OpenStreetMaps, satellite data, and Digital Elevation data to build an environment with accurate heightmap data and distance to scale

## Visualization



- Manually added missing roads and buildings
- Combined data in QGIS and used CityEngine to export models using Unity
- Placed them on a single scene and positioned camera to best support optimal views of interaction

# Using Unity

QGIS mapping information converted into OBJ file

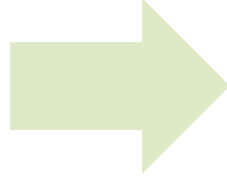
Map components treated as separate game objects

Scripts to control routes, UI, traffic system

Additional assets to build realistic senario

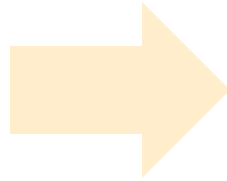
# Using Artificial Intelligence to Simulate Traffic

## Navigation



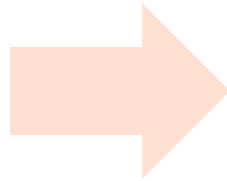
- Use of Unity to build navigation mesh filters onto terrain data, defining movable paths for player and traffic

## Traffic System



- Traffic cars utilize the built-in navigation mesh feature to move around the map
- Spawned in random locations around the map and given random destinations to go towards

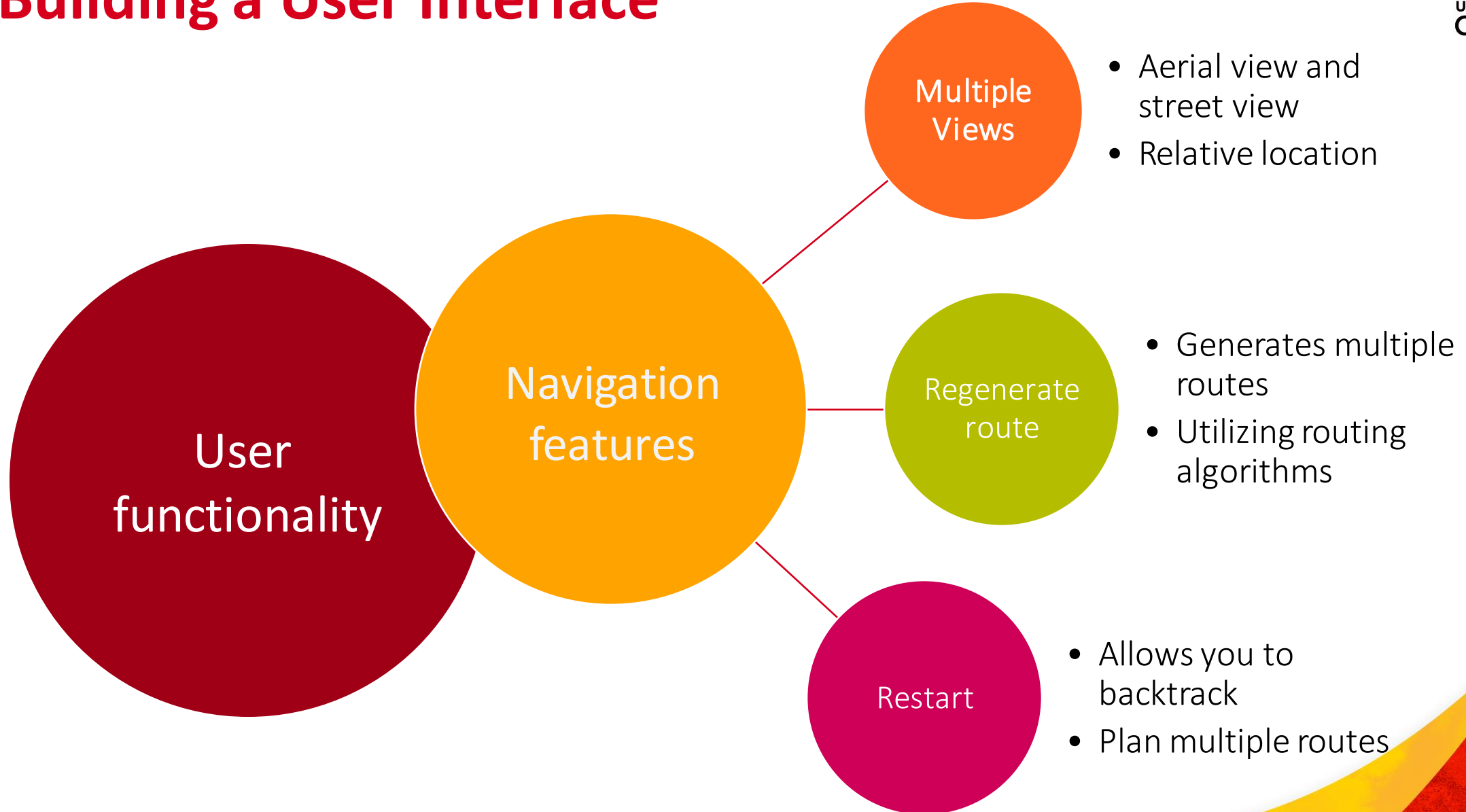
## Collusion Prevention



- The Nav Mesh agent offers automatic collision avoidance, and will automatically adjust its path when it senses another nav mesh agent or obstacle.



# Building a User Interface



# Creating Virtual Reality Experience

Users can visualize  
traffic and experience  
firsthand CHW's  
commutes

VR system is  
SteamVR which works  
with the HTC Vive

Only headset is  
required for a full  
experience

Display viewed by  
user wearing headset  
can be mirrored to a  
monitor

Clean user interface  
integrates with VR for  
a smooth user  
experience

# Quick Demonstration



# Impacts of Solution



## Planning Tool

Identify the safest, quickest, and most convenient routes



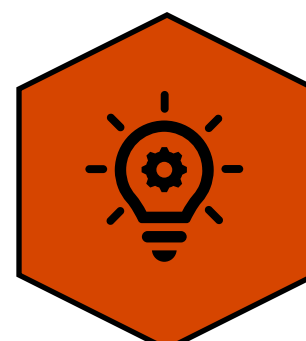
## Route Testing

Increase number of routes tested compared to in-person exploration



## Training Applications

Streamline and increase flexibility of training initiatives for new CHWs



## Increased Efficiencies

Improved process efficiencies lead to positive community impact

# Limitations of Solution

Preliminary study with minimal testing and features

Randomly generated traffic not representative of Malawi

Further reconfiguration required for any new locations explored

Application of tech goggles to Medic Mobile's challenges

# Limitations of VR Technologies

Feasibility

User adoption

Adjustment to VR experiences



# Future Work

## Additional Road Features

- Offer features such as speed limits, two-sided traffic, local traffic laws, and realistic terrain

## Alternative Transportation Forms

- Alternative transportation modes such as mopeds, bicycles, and walking
- Alternative paths such as grass and sidewalks

## Strengthening Use Case

- Expand use cases of VR for Medic Mobile's operations based on technical comfort and competence of users

# Conclusion



## Task

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*Implemented VR solution to visualize roads of Mzuzu, combined with AI traffic generator*



## Impact

*Support CHWs of Medic Mobile to better navigate the communities it serves; effectively enhancing the quality of support*

**Thank You!**



# References

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