

CMU Housing Recommendation Engine

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Agenda

- Vision
- Problem
- Approach / Solution
- Application
- Market
- Business Model
- Competition
- Go-to-Market

Our Vision

Create a customized recommendation platform
for college students to find local housing near the
university

Who are we



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CUSTOMER PAIN



2.7

**Average months
searching***



-6.1

**Net Promoter Score for
rental situation, which
means “not
satisfied”****

Current Solution

Obtain info from multiple sources,
then integrate them by users

Current Cost

Not expensive but time-consuming

Disadvantages

Energy-consuming, time-wasting and
annoying

* ZILLOW GROUP. "CONSUMER HOUSING TRENDS REPORT", 2019

** RESIDENTRATED GROUP. "KEEPING RENTERS HAPPY REPORT", 2019

SOLUTION

A recommendation platform that integrates information relevant to CMU students

Attributes:

Integrated databases

Designed house rating system

Benefits:

Easier choice for housing

Saves time and energy

Data Source



Craigslist

property
information




Yelp

restaurant
information



**CMU
Shuttle**

shuttle stop
and schedule



**Google
Map API**

distance and
transport
information

Data Source - Craigslist

CL

pittsburgh

>

housing

>

apts/housing for rent

apts/housing for rent

search apts/housing for rent

search titles only

has image

posted today

bundle duplicates

include nearby areas

MILES FROM ZIP

miles

from zip

PRICE

min

max

BEDROOMS

min

-

max

BATHROOMS

min

-

max

FT²

min

max

AVAILABILITY

all dates

cats ok

dogs ok

furnished

no smoking

wheelchair access

EV charging

no application fee

no broker fee

housing type

laundry

parking

gallery

<<


< prev

1 - 120 / 3000

next >


newest

\$675




★ Feb 24 **3 bedroom rental home house ford city** \$675 3br - (Ford city)

\$795




★ Feb 24 **Secured Entry, Lots of Closet Space, Sliding Glass Doors** \$795 1br -

\$1335




★ Feb 24 **Cosmopolitan, Ross Township** \$1335 1br - 775ft² - (Pittsburgh)

\$775




★ Feb 24 **1BR Apartment on East Liberty Blvd W/ Central AC and Parking Incl** \$775 1br - (Pittsburgh)

\$1345



★ Feb 24 **Cosmopolitan, Ross Township** \$1345 1br - 775ft² - (Pittsburgh)

\$912



★ Feb 24 **Deluxe Single Bedroom, Near Restaurants & Shops, Aug 1st** \$912 1br - 657ft² - (Regent Square - Frick Park)

Data Source - Yelp API



Restaurants

5000 Forbes Ave, Pittsburgh, PA 15213



Restaurants ▾

Home Services ▾

Auto Services ▾

More ▾

Best Restaurants near Carnegie Mellon University in Pittsburgh, PA

5000 Forbes Ave, Pittsburgh, PA 15213



All

Price ▾

Open Now

Delivery

Takeout

Reservations

Waitlist

Mon, Feb 24 ▾

7:00 pm ▾

2 people ▾

Find a Table

Sponsored Results ⓘ



Choolaah

★★★★★ 312

\$\$ • Indian

📍 1.5 Miles

"Dear Choolaah, please take my money. I don't think there's another **restaurant** where I could feel so good about going out to eat, and for so many reasons. Here's the backstory for..." [more](#)

Start Order

Offers delivery

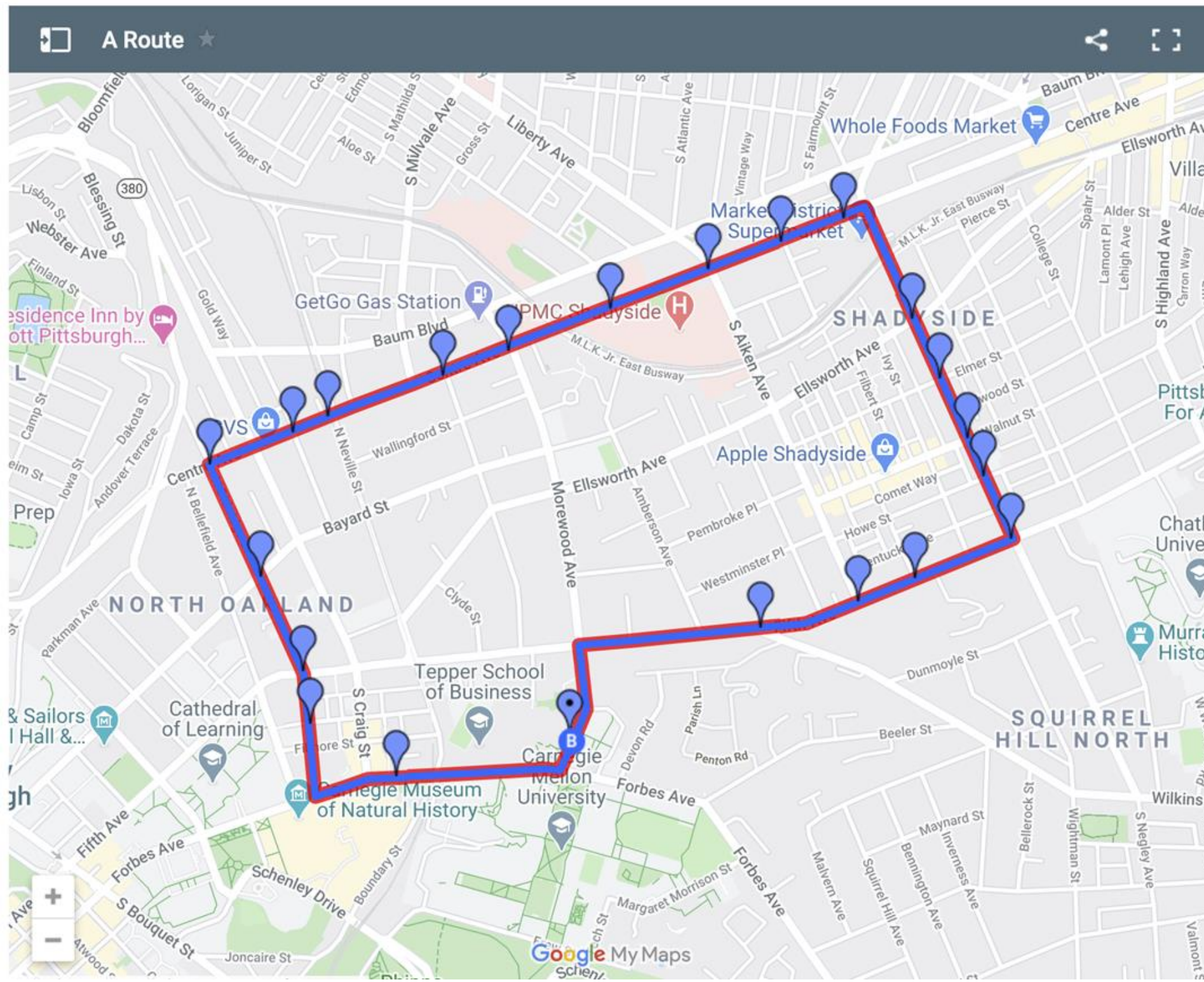
(412) 503-7797

6114 Centre Ave
Shadyside



Data Source - CMU shuttle

[Division of Operations](#) › [University Police](#) › [Shuttle and Escort](#) › A Route



A Route

Shuttle Stops

Departure Times

Other Routes

B Route

A/B Route

Bakery Square Route

PTC Route

Escort Service

Data Source - Google Map API

The image is a screenshot of the Google Maps interface. On the left, a blue sidebar contains navigation icons (menu, home, car, train, walking, bicycle, airplane) and a search bar. The search bar shows two locations: 'Carnegie Mellon University' and 'Chalfont Apartments, 4742 Centre Ave.'. Below the search bar, there's a 'Leave now' button and an 'OPTIONS' button. Further down, there's a 'Send directions to your phone' button. The main part of the sidebar lists three travel options:

- Option 1:** 7:04 PM–7:16 PM, 12 min. Icons for walking, bus, and train. Route: 54 / 71A / 71C. Details: 7:12 PM from Craig St at Park Plaza, \$2.75, 9 min, every 10 min. A 'DETAILS' link is present.
- Option 2:** 7:12 PM–7:24 PM, 12 min. Icons for walking and bus. Route: P3.
- Option 3:** via S Craig St and N Neville St, 17 min, 0.8 mile. Icon for walking.

At the bottom of the sidebar, there's a 'SCHEDULE EXPLORER' button and a link to 'Explore Chalfont Apartments'.

The main map area shows a street map of Pittsburgh. A blue line indicates the route from Carnegie Mellon University (marked with a red dot) to Chalfont Apartments (marked with a red dot). The route goes from Carnegie Mellon University, south on Schenley Drive, west on Fifth Ave, north on Craig St, and then east on Centre Ave to Chalfont Apartments. A callout box on the route says '12 min every 10 min'. The map shows various landmarks including the University of Pittsburgh, Cathedral of Learning, Carnegie Museum of Natural History, Phipps Conservatory and Botanical Gardens, Bob O'Connor Golf Course, and several supermarkets. The map is labeled with neighborhood names like SHADYSIDE, NORTH OAKLAND, and SQUIRREL HILL NORTH. A 'Sign in' button is in the top right corner. At the bottom, there's a 'Satellite' button and a scale bar.

Data Utilization

- Extract the most useful data

What do CMU students care about?

- How did we combine data?

Location of properties

- How do we rate properties?

Assign different weights to attributes → overall score



Rating Rubrics

Dynamic rating system based on the available choices



The weight of calculation can be further learned via machine learning algorithms.

A photograph of a modern, bright hallway. On the left, there is a long white cabinet with multiple drawers and doors, featuring simple metal handles. The floor is made of light-colored wood. A long, narrow rug with a black and white striped pattern runs down the center of the hallway. On the right, there is a balcony with a glass railing and a wooden handrail. The hallway leads to a doorway at the end, which is open, revealing another room. The text "Product Features" is overlaid in the center of the image.

Product Features

Help Menu

`main.py -h` presents a help as shown below:

```
usage: main.py [-h] [-l] [-y] [-s] [-a] [-p PRICE_FILTER [PRICE_FILTER ...]]
               [-t TOP]

optional arguments:
  -h, --help                show this help message and exit
  -l, --latest              Fetches latest properties from Craigslist
  -y, --refresh_yelp        Refreshes restaurants database with latest info from
                             Yelp
  -s, --refresh_shuttle     Refreshes shuttles database with latest info from CMU
  -a, --refresh_all         Refreshes all databases and uses latest information
  -p PRICE_FILTER [PRICE_FILTER ...], --price_filter PRICE_FILTER [PRICE_FILTER ...]
                             Optional price range filter. Usage: -p <MIN> <MAX>
  -t TOP, --top TOP        Number of properties to be displayed
```

Housing recommendations

Step 1: Input 'y' to see the property recommendations

```
Show the top 6 properties we recommend? (y to continue, exit to quit)
```

Example output:

```
1. One Bedroom Available 08/01
```

```
Neighborhood: Oakland
```

```
Size: 415.0 sqft
```

```
Number of bedrooms: 1
```

```
Price: 845$/month
```

```
2. ★Available NOW--AC--Hardwood Floors--Closet Space--Heat Incl!★
```

```
Neighborhood: Squirrel Hill / Murry Ave @ Forward Ave
```

```
Size: 770.0 sqft
```

```
Number of bedrooms: 1
```

```
Price: 1295$/month
```

More details about the property

Step 2: Select the property number from the displayed list

Select a property for more information : (type 'exit' to quit)

Example output:

-----Transport Information-----

Distance to nearest bus stop: 82.0 meters

Distance to CMU: 3222.0 meters

Distance to downtown: 6409.0 meters

Distance to nearest shuttle stop: 2.0014903583595665) meters

-----Restaurant-----

5 restaurants near by

Restaurant name: Selamis Turkish Kebab House

Rating: 4.5

Restaurant name: BFG Café

Rating: 4.0

Restaurant name: Nak Won Garden

Rating: 3.5

Restaurant name: Spork Pit

Rating: 3.5

Restaurant name: Friendship Perk and Brew

Rating: 4.5



Marketing Strategy

Market

Target market: Students looking for housing options around the university (CMU students only at the beginning)

Market size: Over 10,000 customers a year. Most of them will be non-local students of CMU, Pitt, and Carlow

Market drivers: Rental agencies, existing rental websites, individual house owners, and students moving in and out of the town

Business Model

Revenue model

charges: Ads and service

from:

- local rental companies
- house owners
- restaurants

Pricing details: the proportion of house sold through our website

- **Basic:** free to users but property owners will pay for advertising
 - **Premium:** Work with a real person and get recommendations based on historical data
-

Business Model

Evaluating metrics

Advertisement conversion rate

Overall conversion rate

Average advertising revenue

Average order value

Lifetime value for customers

Willingness to advertise

COMPETITION

- Key Players

Local rental agencies - [Amore Management](#), [Arbors Management](#).

Websites - Zillow, Padmapper, etc.

- Market differentiator

specifically designed for college students, no similar competitor integrate information from multiple sources to make customized recommendations.

Our product is specifically designed for college students, unlike craigslist that is for general purpose classifieds or zillow that looks at a broader customer base. Which do not have a similar competitor

LAUNCH STRATEGY / GO-TO-MARKET

Customer Acquisition Approach:

- ▶ **Start-up stage:** Promote among students through posters on campus, social media and chat platforms. Build a minimum viable product with filters on distance to university and downtown, reviews of groceries and restaurants nearby, and rating transportation options
- ▶ **Expansion stage:** Build additional filters and trackers for users to narrow their search and effortlessly follow up
- ▶ **Key driver:** Seasonal demand and supply, effectiveness of filters and recommendations (for effective ads).
- ▶ **Potential milestones:**
5000+ user signups in first year,
\$250,000 ad revenue in first 3 years.

Thanks



HEADQUARTERS

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