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# CAT

PAIN DETECTION IN CATS



## PROJECT SUMMARY

This computer vision project aims to detect pain in cats using the Feline Grimace Scale (FGS), addressing the common challenge that cats instinctively hide discomfort. The model was built using YOLOv8n, to classify cat faces into “pain” and “no pain” categories. The system supports early veterinary assessment and could be integrated into mobile health applications for pet owners, providing real-time, non-invasive screening to enhance feline welfare.

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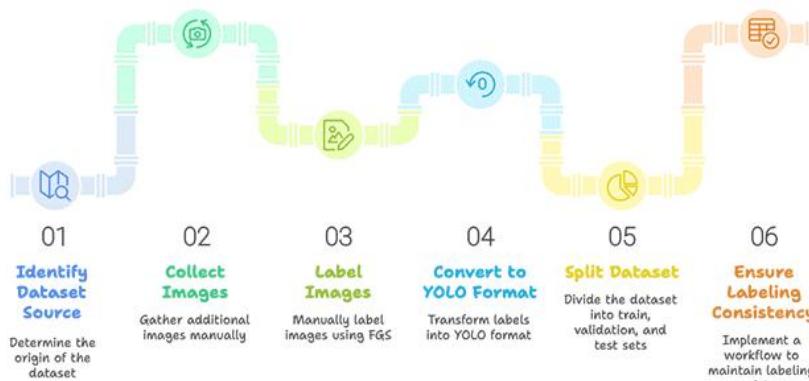
### ROAL:

- Dataset Research & Analysis (Collaborative)
- Manual Labeling (Collaborative)
- Data Cleaning & Augmentation (Collaborative)
- Model Training & Evaluation (my primary responsibility)
- Bias Assessment & Ethical Testing (my primary responsibility)

## BACKGROUND & DATASET & LABELING

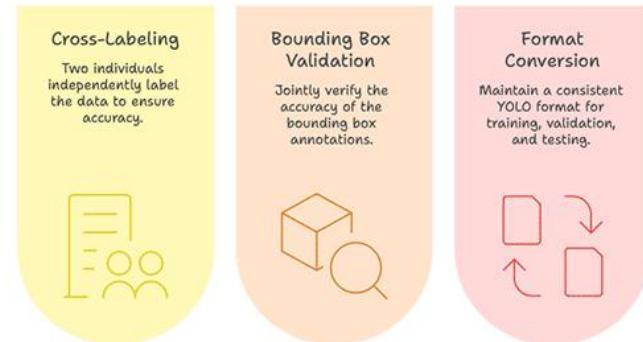
- Source:** dataset (2,079 images) + 60 manually collected images
- Challenge:** Cats rarely show clear signs of pain, and their facial expressions can be really subtle. Dataset lacked required pain labels
- Solution:** FGS gives us a clinically validated way to assess this (ears, muzzle tension, whiskers, orbital tightening, head position), manually Labeled into pain / no pain classes.

CatFLW Dataset Creation Process

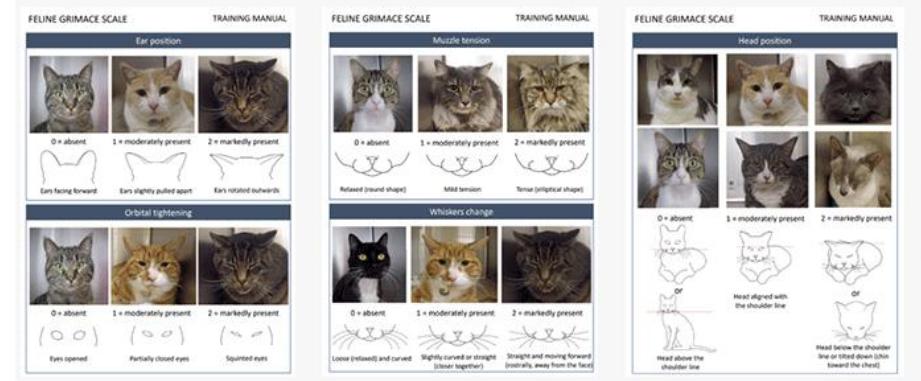


## RESEARCH AND ANALYSIS

### Quality Control Measures

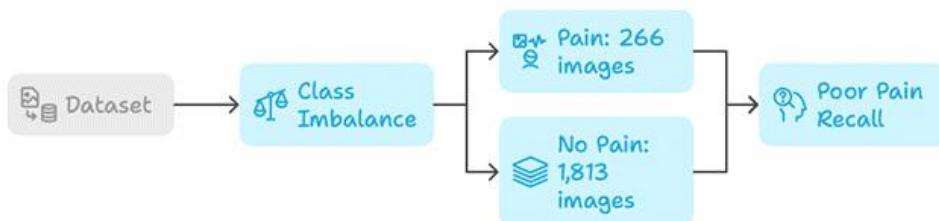


### Feline Grimace Scale (FGS)



# DATASET CLEANING & AUGMENTATION

## Class Imbalance Issue in Pain Detection



- Data Imbalance:

Pain: 266 images

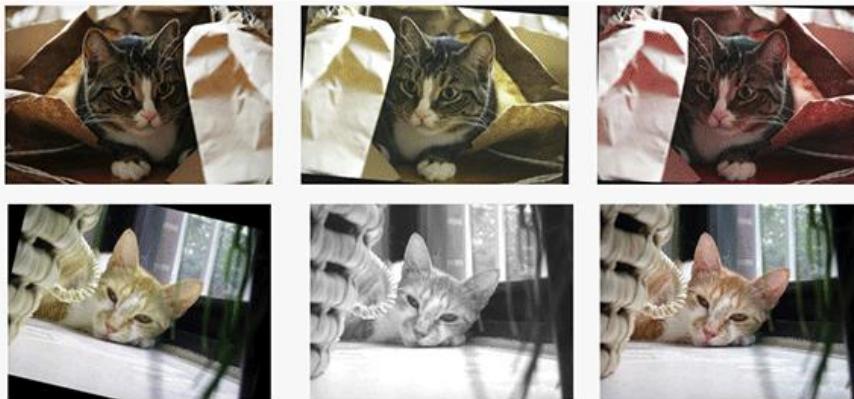
No pain: 1,813 images

→ Severe imbalance led to poor pain recall in early training.

- Augmentation Strategy:

Horizontal flip  
Brightness shift  
Cropping  
Small rotations

→ Additional offline 789 pain images generated



- Duplicate Removal:

Augmented images might accidentally duplicate training/validation data and cause leakage.  
Used pHash to identify near-duplicates

789 augmented → 518 unique images kept

```

def phash(p):
    try:
        with Image.open(p) as im:
            return imagehash.phash(im.convert("RGB"))
    except Exception as e:
        print(f"fail: {p} | {e}")
        return None

def build_hashes(dir_path):
    hs = []
    if not os.path.isdir(dir_path):
        return hs
    for f in os.listdir(dir_path):
        if f.startswith('.') or not f.lower().endswith(IMG_EXTS):
            continue
        h = phash(os.path.join(dir_path, f))
        if h is not None:
            hs.append((f, h))
  
```

# CAT

PAIN DETECTION IN CATS

- Model: YOLOv8n (object detection)

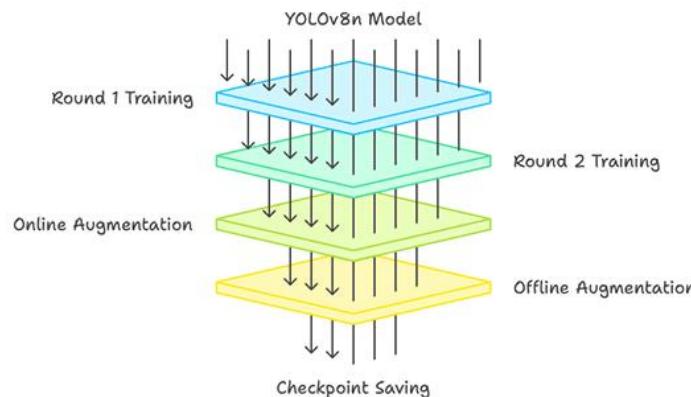
- Two training rounds::

Baseline (Round 1): basic setup , resolution (640)

Improved (Round 2): higher resolution (768), offline + online aug, early stopping

- Goal: Improve recognition of pain without hurting no\_pain accuracy

YOLOv8n Training Process



## MODEL TRAINING

### Round 1

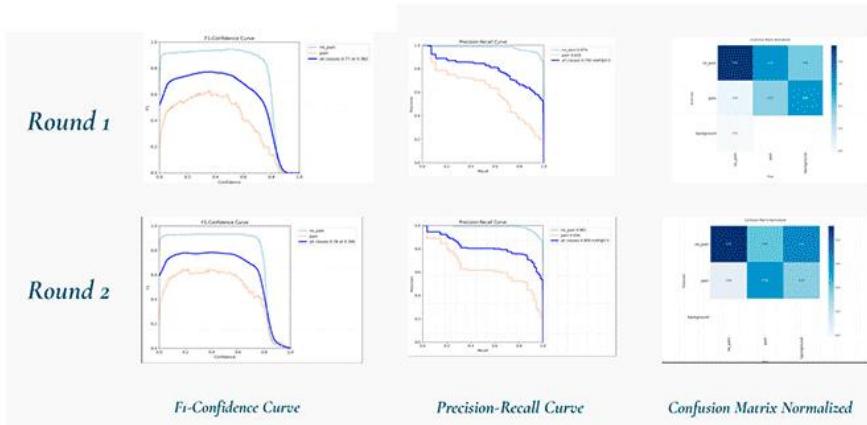
```
Ultralytics 8.3.221 ✘ Python-3.12.12 torch-2.8.0+cu126 CPU (Intel Xeon CPU @ 2.20GHz)
Model summary (fused): 72 layers, 3,006,038 parameters, 0 gradients, 8.1 GFLOPs
val: Fast image access ✓ (ping: 0.5±0.1 ms, read: 122.8±67.2 MB/s, size: 1030.8 KB)
val: Scanning /content/gdrive/MyDrive/Colab Notebooks/final_datasets_cat/labels/val.cache...
      Class   Images  Instances    Box(P      R      mAP50      mAP50-95): 100
          all     417     419    0.766    0.792    0.795    0.541
          no_pain  363     365    0.901    0.973    0.974    0.665
          pain      54      54    0.631    0.611    0.616    0.418
Speed: 4.4ms preprocess, 206.6ms inference, 0.0ms loss, 0.5ms postprocess per image
Results saved to /content/gdrive/MyDrive/cat_pain_project/runs/cat_pain_gpu_fresh_val2
result /content/gdrive/MyDrive/cat_pain_project/runs/cat_pain_gpu_fresh_val2
```

### Round 2

```
Ultralytics 8.3.221 ✘ Python-3.12.12 torch-2.8.0+cu126 CUDA:0 (Tesla T4, 15095MiB)
Model summary (fused): 72 layers, 3,006,038 parameters, 0 gradients, 8.1 GFLOPs
val: Fast image access ✓ (ping: 0.4±0.1 ms, read: 121.8±21.4 MB/s, size: 323.4 KB)
val: Scanning /content/gdrive/MyDrive/Colab Notebooks/final_datasets_cat_v2/labels/val.ca...
      Class   Images  Instances    Box(P      R      mAP50      mAP50-95): 100
          all     417     419    0.759    0.817    0.809    0.566
          no_pain  363     365    0.927    0.936    0.981    0.671
          pain      54      54    0.592    0.697    0.636    0.461
Speed: 2.8ms preprocess, 5.8ms inference, 0.0ms loss, 1.7ms postprocess per image
Results saved to /content/gdrive/MyDrive/cat_pain_project/runs/cat_pain_v3_val
VAL content: /content/gdrive/MyDrive/cat_pain_project/runs/val_report_run3_explicit
```

# CAT

PAIN DETECTION IN CATS



## FINAL TEST

Achieved 0.945 mAP50

Pain detection recall improved from  $0.37 \rightarrow 0.682$

- Performs well when the cat's face is clear and well-lit.
- Misses some low-quality or side-angled pain cases.
- Sometimes it also marks "pain" on cats that are just tense or alert, not truly in pain.
- Flat-faced breeds (e.g., Persians) are still difficult to classify accurately; the dataset didn't have enough of them.
- Future datasets should include more facial diversity.



Left: ground truth labels. Right: predicted results, showing several incorrect detections.

## MODEL PERFORMANCE EVALUATION

### • Performance:

Dataset rebalancing, augmentation, and duplicate removal directly strengthened minority-class performance. Round 2 consistently outperforms Round 1 in mAP, recall, and F1 stability.

The model becomes more sensitive to subtle pain expressions, maintains strong precision, and generalizes better on unseen data.

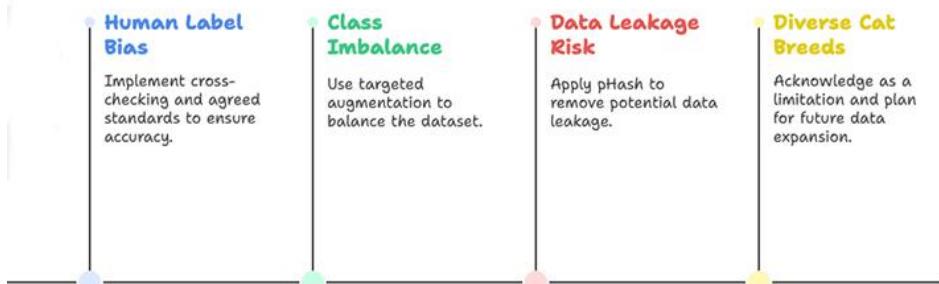
# CAT

PAIN DETECTION IN CATS

## Ethical Considerations:

- Should be used only as an assistive tool
- Model may misinterpret normal tension as pain
- Avoid replacing veterinary diagnosis

## How to address challenges in cat breed classification?



CatFLW dataset: <https://www.kaggle.com/datasets/georgemartvel/catflw>

Feline Grimace Scale (FGS): <https://www.felinegrimacescale.com/>

Final Datasets: <https://drive.google.com/file/d/1Q4YRALYJRPGGyxsZd7JjKyQgqxhqL0eu/view?usp=sharing>

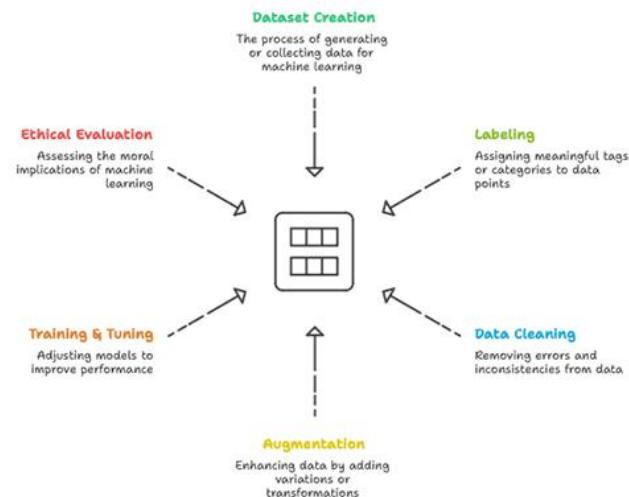
GitHub: <https://github.com/sophiapyx/IAT360-Computer-Vision-Project>

## ETHICAL & OUTCOMES

## OUTCOMES:

- Built a reliable pain detection system using YOLOv8
- Improved performance from baseline mAP50 0.795 → 0.945
- Pain detection sensitivity increased from 0.37 → 0.682
- Final model is deployable for real-time inference
- Demonstrated competency in full ML pipeline

## Competency in Machine Learning Pipeline



# CHATBOT

SFU HEALTH & COUNSELLING CHATBOT



## PROJECT SUMMARY

This project builds a GPT-4 Mini-powered chatbot for the Simon Fraser University Health and Counselling website to deliver fast, accurate, and accessible answers pulled directly from SFU resources. By automating information access, the chatbot improves user experience and simplifies navigation across complex web content.

## ROLE

- Web Scraping & Data Cleaning (Collaborative)
- Structured Q&A Generation(Teammate A)
- Embedding & Vector Database Construction (my primary responsibility)
- Retrieval Logic & Guardrails(Teammate B)
- System Debugging(Collaborative)
- User Testing & Ethical Evaluation (my primary responsibility)

# RESEARCH AND ANALYSIS

## CONTEXT & PROBLEM

Students often struggle to find essential health resources due to SFU's deeply nested, content-heavy web structure.

Key challenges include:

- Time-consuming navigation
- Repetitive questions to staff
- Critical information buried in multiple subpages
- No unified entry point for “I need help now”

### Design Goals



### RAG Pipeline



### Model Choice: GPT-4 Mini

- fast inference
- strong accuracy (82% MMLU)
- good performance with structured RAG data

# CHATBOT

SFU HEALTH & COUNSELLING CHATBOT

## DATA COLLECTION & WEB SCRAPING

URL	Created	Type
1_1_3_5	2025-11-26 1:38 PM	Text Document
1_1_12_1_2	2025-11-26 1:38 PM	Text Document
1_2_1_3	2025-11-26 1:49 PM	Text Document
1_2_3_4	2025-11-26 1:49 PM	Text Document
1_2_6_4_3	2025-11-26 1:51 PM	Text Document
1_2_6_5_1	2025-11-26 1:51 PM	Text Document
1_2_6_5_2	2025-11-26 1:51 PM	Text Document
1_2_6_5_3	2025-11-26 1:51 PM	Text Document
1_2_6_5_7	2025-11-26 1:51 PM	Text Document
1_2_6_6	2025-11-26 1:50 PM	Text Document
1_2_7_9_1	2025-11-26 1:53 PM	Text Document

- Manually collected URLs across the SFU HCS website, cleaned duplicates, removed broken links and PDFs → 413 valid pages.
- Used BeautifulSoup to extract readable text → saved to clean TXT files.

### • Outcome:

A clean, consistent dataset suitable for RAG.

## STRUCTURED Q&A GENERATION

Instead of feeding long web pages into the model, we converted text into 4500+ synthetic Q&A pairs, grounded in the scraped content.

### Why this matters:

- Better alignment with natural user queries
- Reduces hallucinations
- Makes retrieval more accurate
- Supports under-represented pages
- Allows evaluation of output correctness

Questions
1. What services are available to SFU students at all campuses?
2. Are the health and counselling services at SFU free for students?
3. Where can I find the hours and locations of health clinics at SFU?
4. Which campuses offer student health clinics?
5. What types of support does Health and Counselling provide?

Answers
1. Health clinics, counselling services, individual sessions, group activities, self-guided resources, medical services, group counselling sessions, and support workshops.
2. Yes, the health and counselling services at SFU are free for students.
3. You can find the hours and locations of health clinics at SFU by checking the relevant sections on their website, specifically the links for "View hours, locations, and booking options."
4. Burnaby and Vancouver campuses.
5. - Individual sessions - Group activities - Self-guided resources - Free, confidential counselling support - Group counselling and support workshops - Medical services through doctors and nurses

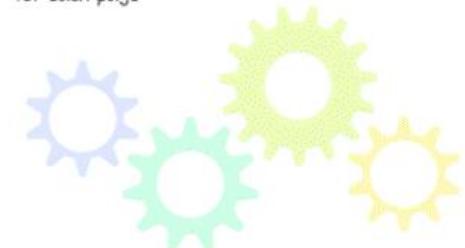
## Question and Answer Generation Process

### Save to CSV

Store questions and answers in a structured CSV file

### Generate Questions

Create questions for each page



### Generate Answers

Use page text to answer questions

### Review Mismatches

Manually check for errors and blank outputs

# CHATBOT

SFU HEALTH & COUNSELLING CHATBOT

```

client = OpenAI(api_key=API_KEY)

def get_embedding(text, model="text-embedding-3-small"):
    if pd.isna(text):
        return [0.0] * 1536

    text = str(text).replace("\n", " ")
    response = client.embeddings.create(
        model=model,
        input=[text]
    )
    return response.data[0].embedding

df = pd.read_csv("StructuredQA_final.csv", encoding="latin1")

embeddings = df["Question"].apply(get_embedding)
embedding_df = pd.DataFrame(embeddings.tolist())

embedding_df.to_csv("EmbeddingsFinal.csv", index=False)

print("Embeddings generated successfully.")

```

## Snippet of the embeddings:

0	1	2	3	4	5
0.000788	-0.01871	0.034429	0.051474	0.0282019	0.007595
0.007497	-0.00304	0.0480737	0.042297	-0.03404	-0.00966
0.0185249	-0.00654	0.080436	0.0107483	-0.03943	0.000592
-0.01162	0.0361105	0.089224	-0.01752	-0.03614	0.0127722
-0.01971	0.0246545	0.008369	0.079796	-0.04501	-0.0128
-0.05907	-0.04204	0.0620822	0.028819	-0.01877	0.0255782
0.0240538	-0.01007	0.049554	0.037578	0.00397	0.0268309
-0.0264	-0.02328	-0.0303	0.042684	-0.0107	0.039471
-0.03261	-0.01143	-0.02992	0.0558757	-0.0097	0.036827

### • Embedding Model:

text-embedding-3-small (1536 dimensions)

- Provides strong semantic understanding
- Produces vectors for similarity search

### • Steps:

- Chunk structured Q&A
- Convert each row into embeddings
- Ensure correct row-to-embedding alignment
- Store in database for retrieval

## Chatbot Workflow Cycle



## GUARDRAILS & SAFETY DESIGN

The chatbot uses confidence scores to decide how to respond:

### • Response Modes:

- Confident answer (high similarity)
- Verification mode
- Fallback message (insufficient context)

```

def gen_prompt_for_confident_response(context, query):
    augmented_prompt = f"""Answer to the user's question based on this retrieved context. Refer your response
    to the given URLs.
    Context:{context["Text"]}
    Query: {query}
    URLs: {context["URL"]}""
    return augmented_prompt

def gen_prompt_for_probable_response(context, query):
    augmented_prompt = f"""Respond to the user. Use the retrieved context if needed and check with the user if
    this is the data that they are looking for. Refer your response to the given URLs.
    Context:{context["Text"]}
    Query: {query}
    URLs: {context["URL"]}""
    return augmented_prompt

def gen_prompt_for_no_retrieval(query):
    augmented_prompt = f"""The answer to the user's query is not found in the data.
    If it is a general question, answer it. If not, ask the user to be more specific about the data that they
    need.
    Query: {query}""
    return augmented_prompt

```

### • Additional Safety:

- A disclaimer appended to every message
- Not intended to replace counsellors
- Encourages contact with official support when needed

## Ethical and Privacy Risk Assessment



## Mitigations:

- Clear disclaimers
- Conservative fallback responses
- Future crisis-safe replies
- More robust keyword understanding
- Regular dataset updates
- Periodic log cleaning

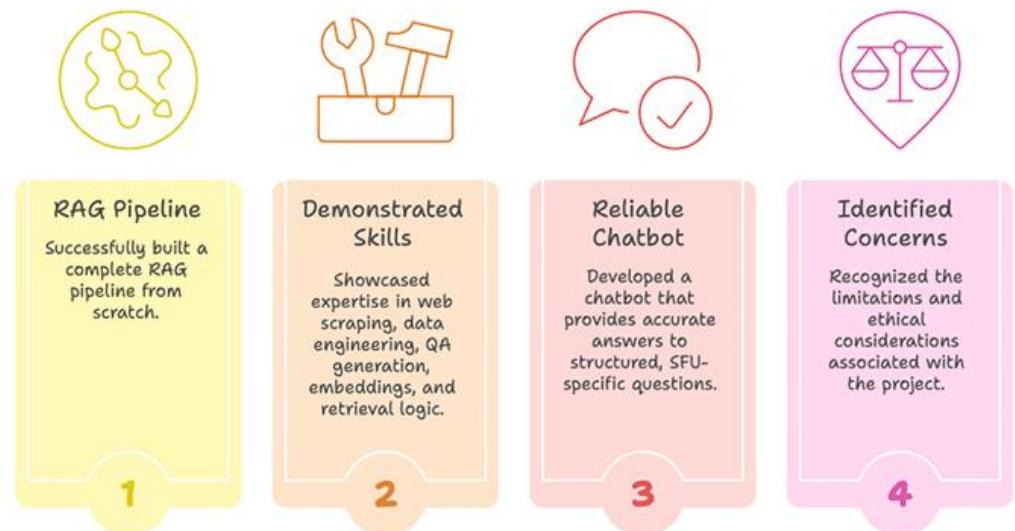
## RESULTS &amp; PERFORMANCE EVALUATION

- ✓ Complete questions
- ✓ SFU-specific queries
- ✓ Familiar website topics
- ✓ Multi-turn conversations

## Struggles with:

- ✗ Single-word or vague queries
- ✗ Emotional or crisis-related messages
- ✗ Off-topic questions
- ✗ Pages missing from dataset
- ✗ Formatting errors (leading whitespace)

## Outcomes





## PROJECT SUMMARY

Downtown Vancouver's dining culture is vibrant but volatile. Many restaurants open and close rapidly, influenced by shifting consumer habits, high rent, and post-pandemic recovery. Our team developed a scroll-based visualization website that explains why this turnover happens and what patterns emerge when we analyze a decade of city data.

Our focus was to turn complex data into a clear, readable narrative supported by strong visual language and smooth interaction design.

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## ROLE

- Data Analysis & Preprocessing (Teammate A)
- Visualization Engineering (Teammate B)
- Narrative & Web Experience Design (my primary responsibility)

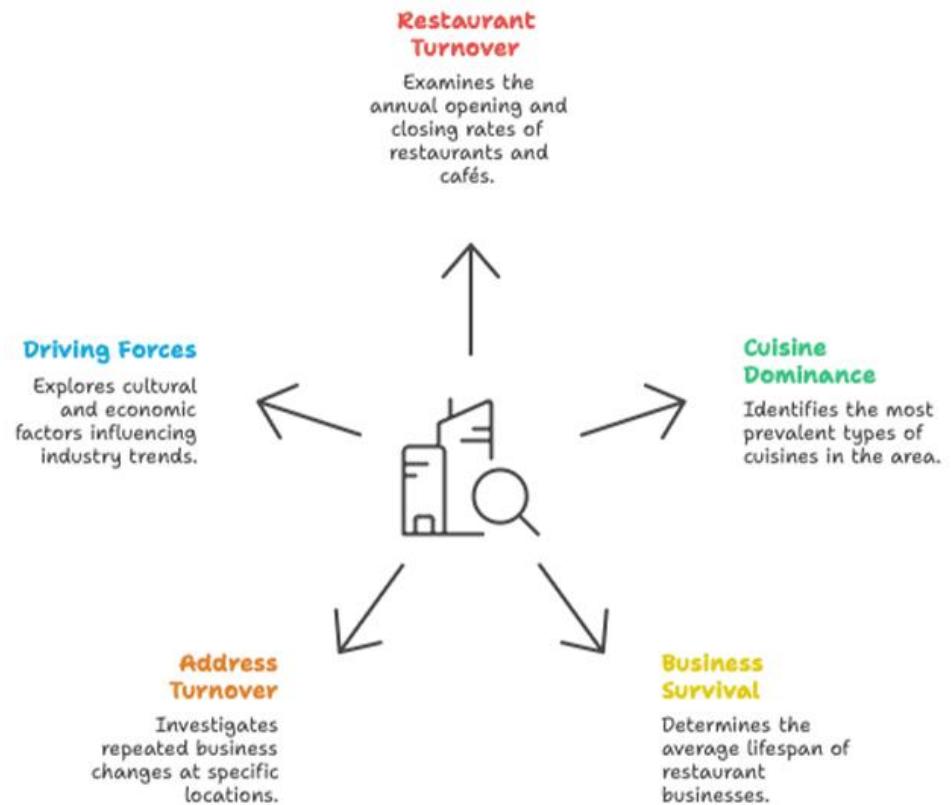
## CONTEXT & MOTIVATION

Vancouver's restaurant industry is culturally rich but extremely competitive. To understand these macro pressures at a micro scale, we focused on postal code V6E, a dense cluster of cafés, sushi bars, and full-service restaurants.

### Challenges in Vancouver's Restaurant Industry



### Restaurant Industry Analysis



## DATA SOURCE

City of Vancouver —  
Business Licences Dataset  
(2013–2024)  
Contains:

- Business type
- Opening & closing dates
- Active/expired status
- Location coordinates
- Cuisine categories

# VISUALIZATION

VANCOUVER RESTAURANT VISUALIZATION

## NARRATIVE ARCHITECTURE

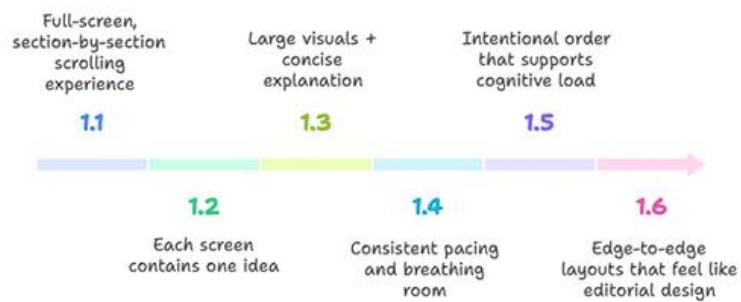
Full storyline, using a “macro → micro → explanation” reading path. which visualization appears where, what question it answers, and how readers should interpret it.



## INTERACTION DESIGN

Full-screen, section-by-section scrolling experience. This changed the project from “a collection of charts” into a guided visual narrative.

### Scroll-Snap Storytelling



## VISUAL IDENTITY & ILLUSTRATION

To unify the project visually, I designed:

- A soft blue-based color palette to evoke Vancouver's urban/coastal identity
- Custom icons
- Section divider illustrations to reinforce narrative modules
- Typographic scale for headers, captions, and explanatory text
- Consistent margins, spacing, and alignment grid

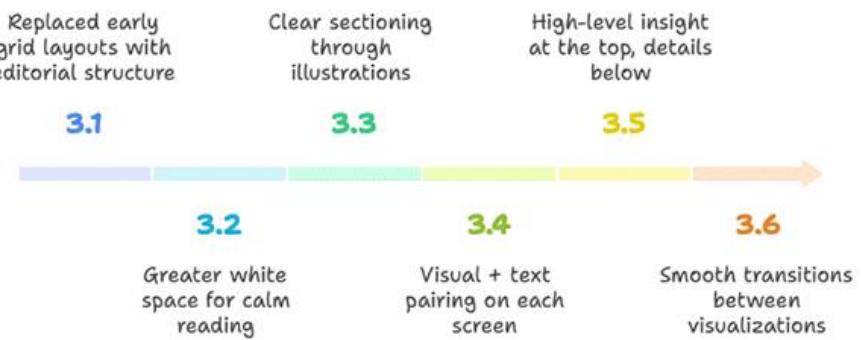
These elements act as visual anchors, helping users understand where they are in the story.



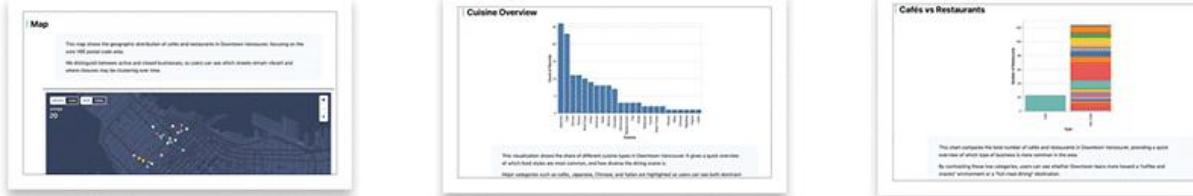
## LAYOUT & EXPERIENCE DESIGN

Replaced early grid layouts with a more refined editorial structure. This dramatically improved readability and narrative coherence.

### Refining Layout and Experience Design



## VERSION 1 — EARLY EXPLORATION



- Built the initial structure and experimented with grid layouts and annotation cards.
- Focused on testing how visualizations could support the emerging narrative.
- Established the first reading flow: simple “text → chart → explanation.”
- This version helped us understand what the data could reveal and what story we might tell.

## VERSION 2 — VISUAL IDENTITY DEVELOPMENT

- Introduced a scroll-based, full-screen narrative layout.
- Designed a custom icon and illustration system to support storytelling.
- Refined color palette, spacing rhythm, and section dividers for clearer pacing.
- Strengthened the storyline by linking visuals to cultural and behavioural context.
- Although not all elements appeared in the final implementation, this version defined the core narrative experience.



## FINAL VERSION — COLLABORATE



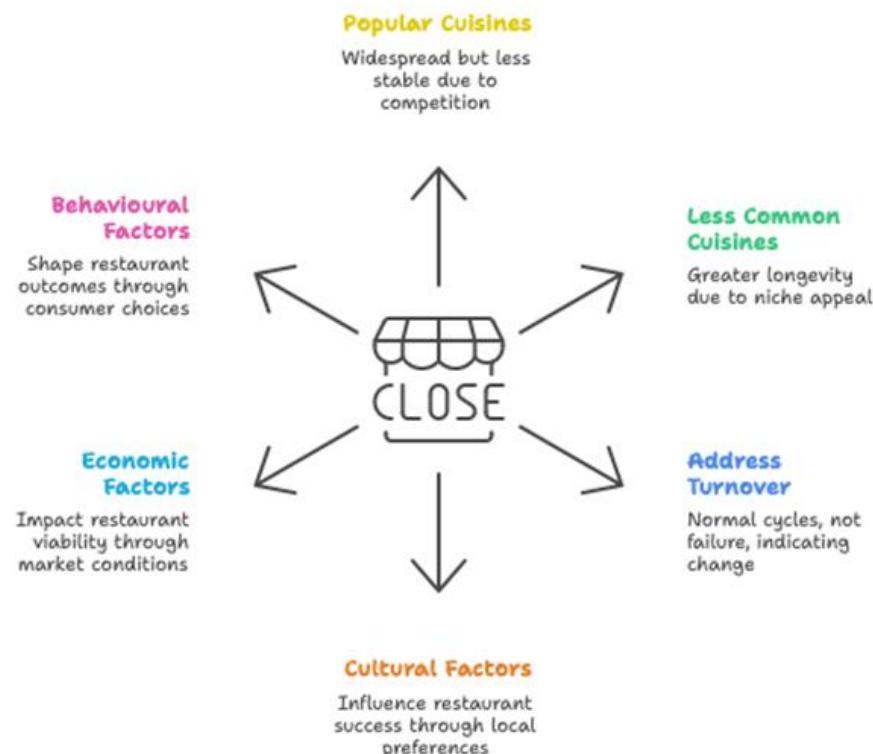
- Integrated the final storyline with interactive visualizations built by teammates.
- Simplified the layout for readability and smooth scrolling across sections.
- Combined narrative text, images, and charts to present a cohesive data story.
- Reflects collaborative decisions, technical constraints, and refined content flow.

## CHALLENGES & SOLUTIONS

- Data quality issues → Required extensive cleaning and validation.
- Visual placement and spacing → Adjusted layouts for readability.
- Storyline clarity → Instructor feedback led to stronger contextual text.
- Implementation sync → Early technical conflicts were resolved collaboratively.

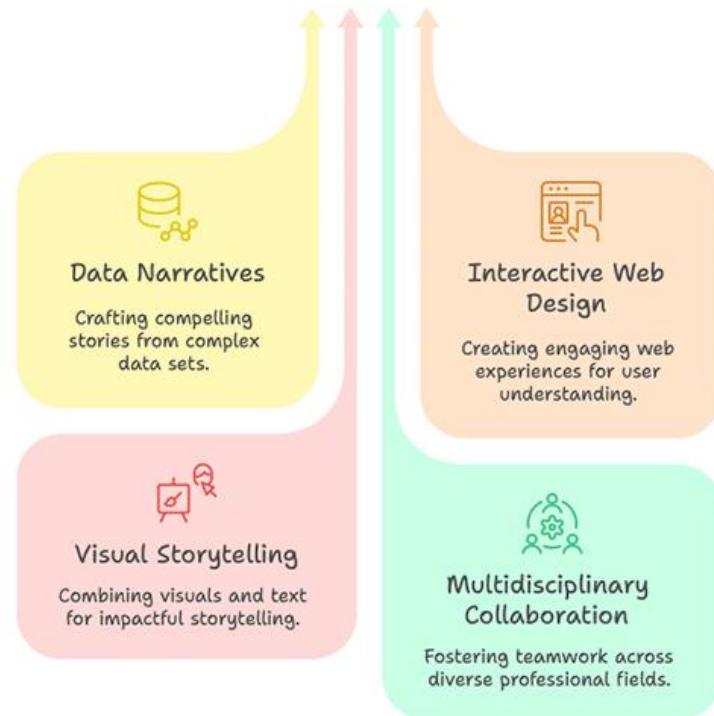
## FINAL INTERPRETATION

### Restaurant Closure Narratives



## REFLECTION

This project enhanced my ability to:



## OUTCOME

A clear, narrative-driven web experience that explains how restaurant density, cuisine popularity, lifespan patterns, and turnover cycles shape the dining culture of Downtown Vancouver. The project translates raw data into an accessible, visually guided story.

Link: <https://sophiapyx.github.io/Visualizations3.html>



## PROJECT SUMMARY

This is an educational music software designed for children aged 3-7, categorized as an enlightenment and intelligence development tool for children. It focuses on learning about the structure, timbre, and famous pieces of Chinese traditional instruments. Through personalized game-based learning methods, it enhances children's musical sense, strengthens their memory, promotes intellectual development, and satisfies learners' emotional needs beyond acquiring knowledge.

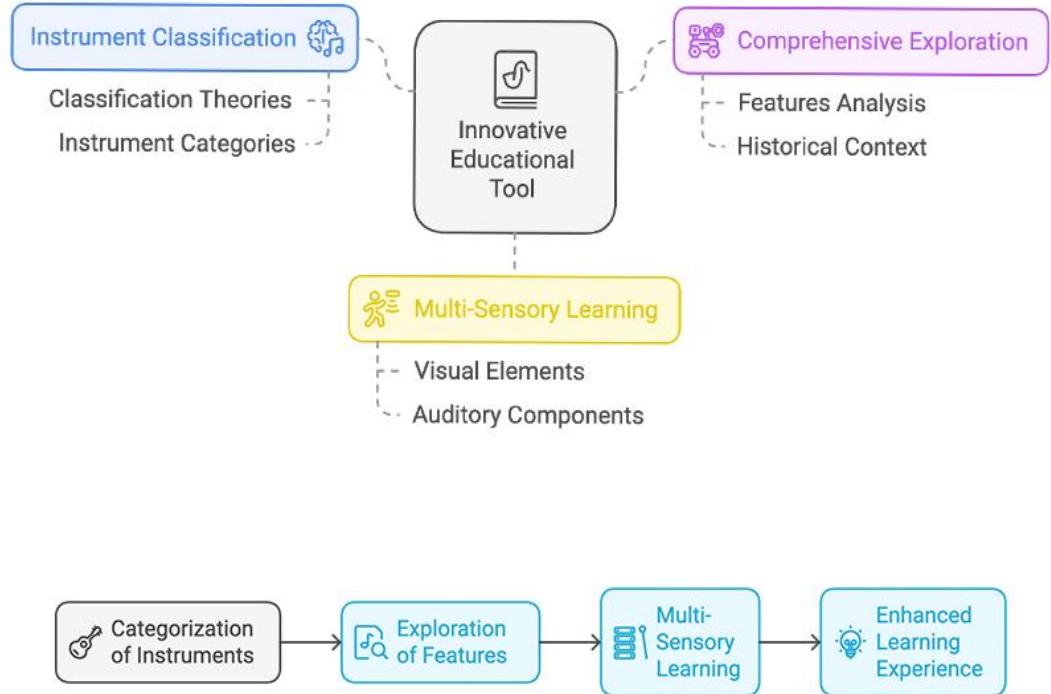
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### ROAL:

- Research and Analysis
- Game Design
- UX Design
- UI Design
- Music Design

## RESEARCH AND ANALYSIS

### Enhancing Music Education



## UX/UI DESIGN

- Target Audience: Children aged 3-7

- Interface Design:

From a psychological perspective, interface design primarily involves two levels: sensory (visual, tactile, auditory) and emotional. From the perspective of product design and development, interface design should adhere to three key principles: user-controlled interfaces, reducing the user's memory load, and maintaining interface consistency.



### Interface Design

#### User-Friendly Interaction

Simplified interactions that enhance user satisfaction.



#### Diverse Styles

Use of varied forms and colors to enhance visual appeal.

#### Intuitive Elements

Interface components that are easy to understand and use.

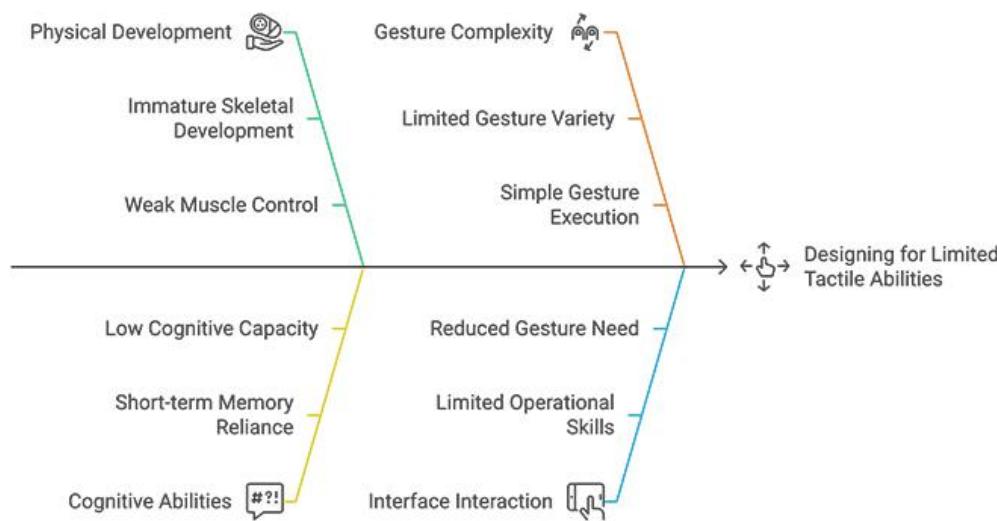
#### Effective Feedback

Providing users with clear and helpful responses.

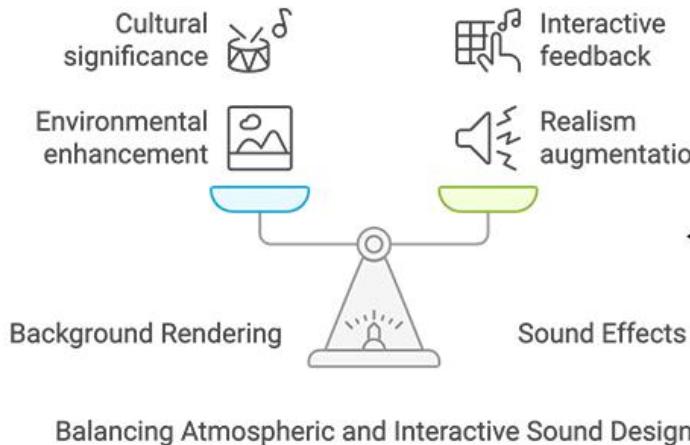
#### Flexible Architecture

An adaptable and open interface structure.

### Challenges in Tactile Design for Young Children



手势名	手势图	Apple iPhone	Microsoft windows 7	Gestureworks
单击手势		模拟鼠标单击	停止列表框	模拟鼠标单击
拖动手势		移动对象、视角	模拟鼠标拖拽	移动对象
滑过手势		快速缩放或者翻页	移动内容对象	快速移动对象或翻页
捏手势		缩小对象、关闭程序 (ipad)	缩小对象	缩小对象
伸展手势		放大对象	放大对象	放大对象
按住手势		模拟鼠标右键	模拟鼠标右键	模拟鼠标右键
三指挤压手势			缩小或者关闭程序	
两指单击手势			缩放或者返回到默认大小及超链接	打开文件
双击手势		用手指放大图片或者打开文件和文件夹	对象缩放或者打开文件和文件夹	打开文件
按住并单击手势		模拟鼠标右键的功能	模拟鼠标右键的功能	模拟鼠标右键的功能
按住并拖动手势		缩放对象	定点转动	移动滑块
旋转手势		旋转对象	图片或者对象旋转	选择对象



- **The Role of Sound:**

Background rendering and event prompts not only enhance the atmosphere but also provide auditory feedback for information. Through sound, learners can receive implicit cues about the correctness or errors in their operations, allowing their actions to be promptly affirmed or corrected.

- **The Function of Sound:**

Sound is categorized into sound effects and music. Sound effects enhance the realism and atmosphere of the interface by augmenting visual information with auditory elements. Music amplifies the emotions conveyed by the visuals, providing learners with an immersive and engaging experience.

- **Challenge**

The music education software for Chinese traditional instruments needs to cover ten types of instruments: guzheng, dizi, erhu, pipa, suona, yangqin, hulusi, matouqin, and sheng. However, Chinese traditional instruments have strong individual characteristics, and ethnic ensembles often lack breadth in sound expression, particularly in the low frequencies, leading to poor overall sound integration. Due to the limitations of the instruments' ranges and playing techniques, it is often challenging to meet listeners' aesthetic demands in various aspects during ensemble performances.

- **Solution**

The background music composition utilizes the new folk music arrangement approach, combining ethnic instrumental music, MIDI music, and electronic band elements with modern orchestration techniques. This method allows for complementing strengths and addressing weaknesses, enhancing the musical personality of traditional instruments and significantly improving the artistic expressiveness of ethnic music. Thus, the five original pieces of music integrate traditional instruments, musical styles, rhythms, and Western music influences.



New folk music arrangement in education software

Pros	VS	Cons
Enhances sound integration		Requires understanding of timbres
Improves artistic expressiveness		Limited by instrument ranges
Creates emotional atmosphere		Challenges in ensemble performances
Highlights traditional instruments		Potential for over-complexity
Aligns with children's emotions		May not meet all aesthetic demands

## PROTOTYPE PRESENTATION



Interface 1-- loading animation

### Game levels include:

- Single instrument puzzle
- Instrument matching
- Real instrument matching
- Identify the instrument by listening to famous tunes
- Instrument and sound match-3 game



Interface 2 – Main Interface

Click the button to enter the level interface.



Interface 3 – Level Interface

There are 5 levels in total.  
Swipe left or right to choose a level.



Interfaces 1, 2, and 3 will loop the original background music titled “Joyful Journey.”



First Learning Level – Instrument Puzzle.

Select the First Level  
Enter the Instrument Puzzle interface, which contains a total of ten different instruments.Tap on any instrument to proceed to the next screen.



● Second Learning Level – Instrument Shape Matching

Enter the Instrument Shape Matching interface. Drag the chibi-style instrument icons to the corresponding shadow positions to match them. When matched correctly, the corresponding instrument sound effect will play.Upon entering the matching interface, the original background music “Joyful Match” will loop.



● Third Learning Level – Matching Real Instruments with Chibi-Style Instruments

The real instrument appears for three seconds and then disappears.A chibi-style version of the instrument then appears, and you must select the matching instrument.Once you choose correctly, the level is cleared.The original background music “Joyful Choice” loops during this stage.



● Fourth Learning Level – Identify the Instrument by Listening to Famous Music Excerpts

The music player in the bottom-right corner can randomly play ten different famous instrument piece excerpts. Listen to each excerpt and select the correct instrument. Once you make the correct choice, the instrument changes from a virtual image to a real one. After correctly identifying all ten instruments, the level is completed.



● Fifth Learning Level – Instrument and Sound Matching

Because this stage involves pairing instruments with their sounds, no background music is provided to avoid interfering with the learner's auditory focus.



## PROJECT SUMMARY

The mobile application "Beautiful styling" is a lifestyle service tool designed to meet users' needs for outfit coordination. It primarily includes eight main functional modules: User Information, Wardrobe, Styling, Recommendations, Store, Styling Guide, Rewards, and User Feedback. This app serves as a one-stop solution for fashion and style needs, ensuring users have a seamless and enjoyable experience in managing and enhancing their personal style.

## TARGET AUDIENCE

- Customers served by Fengdi Clothing Company.
- The company aims to leverage innovative technology to enhance user engagement, improve customer retention, and expand private domain traffic.

## ROAL:

- Research and Analysis
- UX Designer

# Styling

AN APP FOR MATCHING OUTFITS

## RESEARCH AND ANALYSIS

### From life

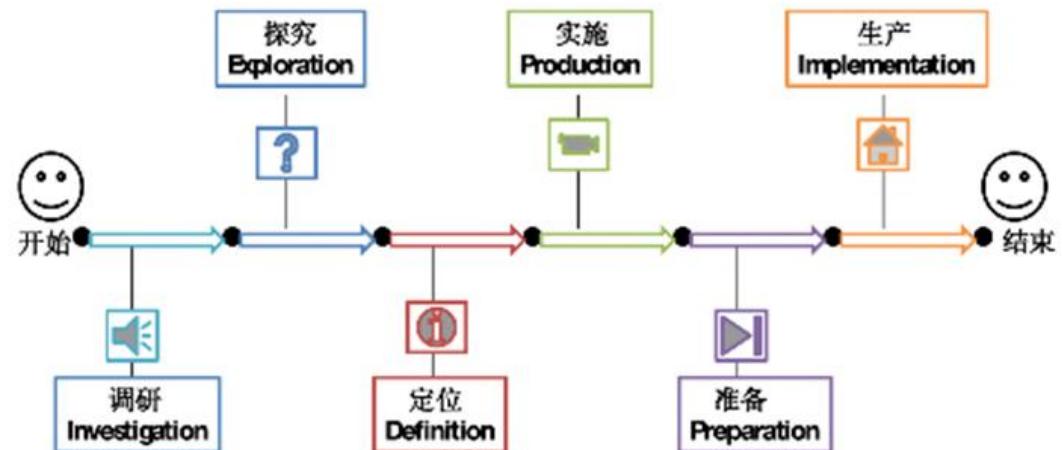
The personal feelings of team members, there are many clothes, but still don't know what to wear, don't know how to match their own clothes

Friends around me don't know how to wear clothes with them, and they are eager to know how to match them.

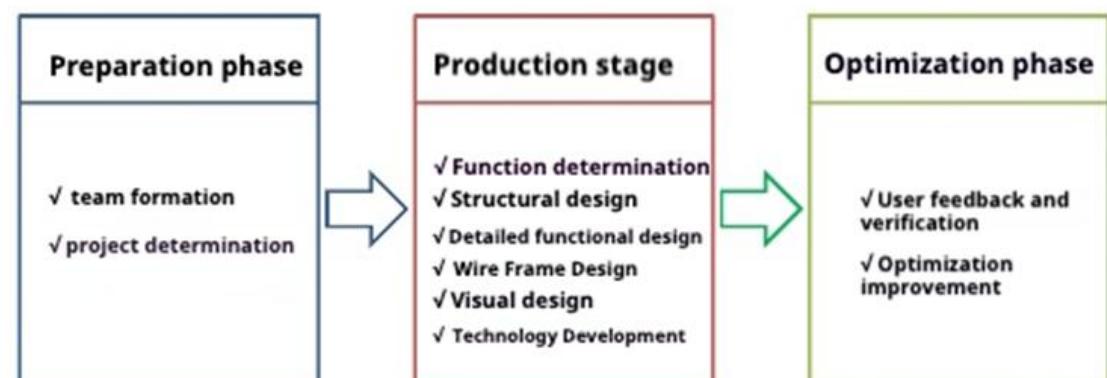
### From research

Research company customers, feedback does not know how to wear, such as someone to guide how to match clothes, will increase the desire to buy. We brainstormed a lot of ideas and finally thought that five of them were good. After that, we did user interest research on these five topics.

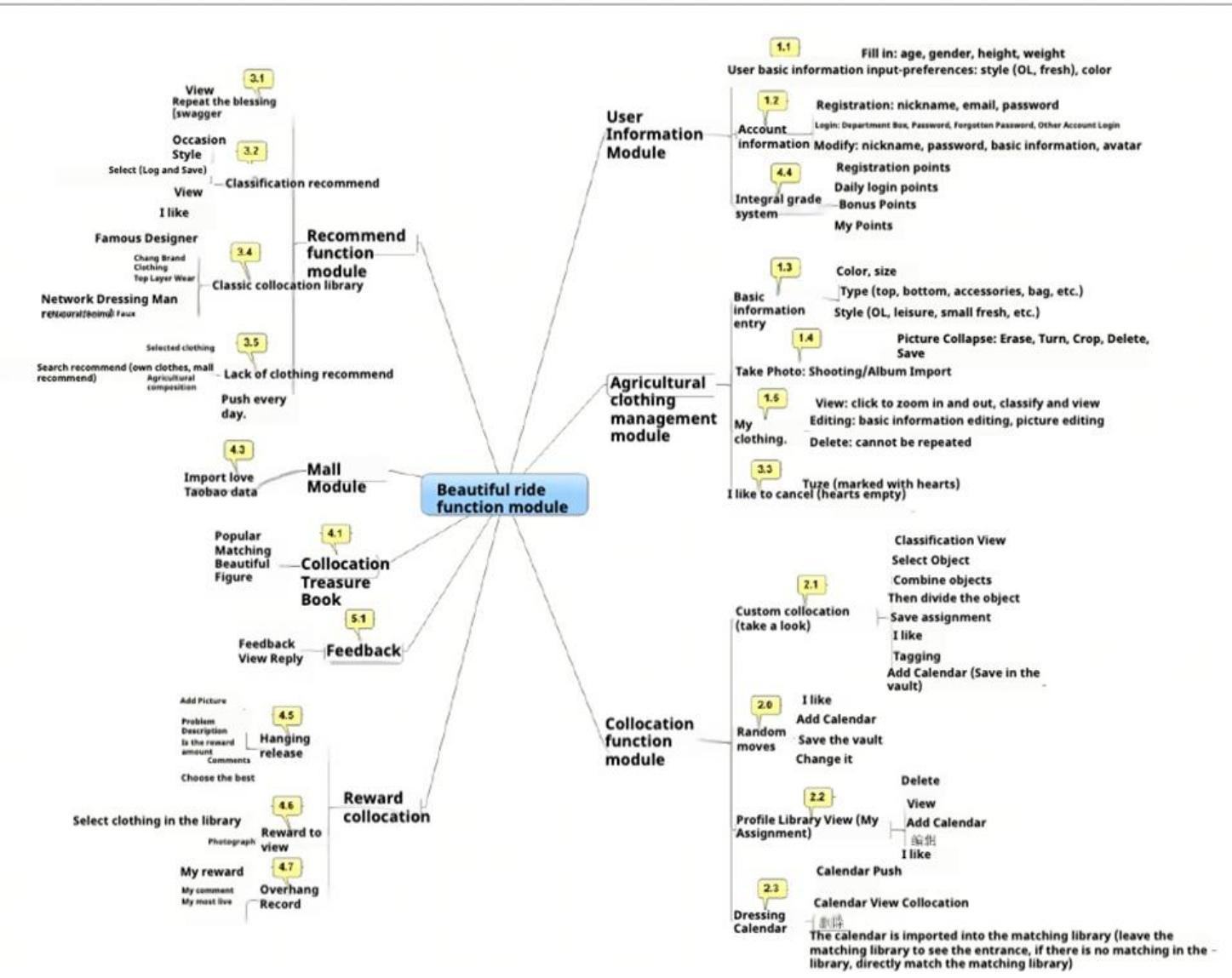
A total of 200 people were surveyed, with a male-to-female ratio of 47%:53%. The interest in five topics is as shown in the figure.



## FLOWCHART



# INFORMATION ARCHITECTURE



## CORE OF THE PRODUCT

By analyzing user interests, item data, and behavior data, and combining this with research on clothing matching methods, the product establishes accurate recommendation rules based on key dimensions such as season, occasion, color, and style. When users are unsure how to match their outfits, product provides the most suitable outfit recommendations.

## PRODUCT INNOVATION

Intelligent Recommendation (Core Feature)

## MAIN FEATURES (see the diagram on the left)

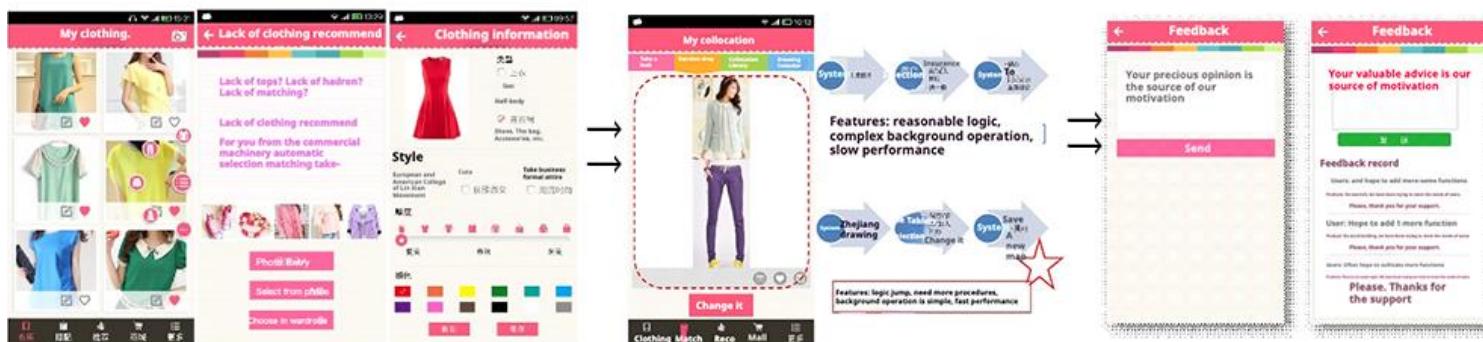
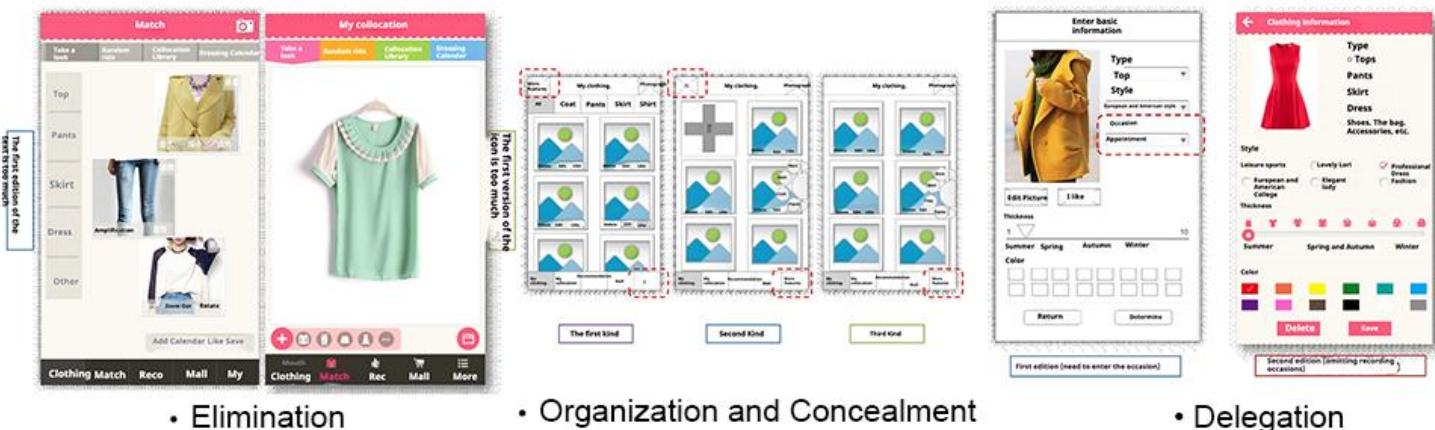
- User Information
- Wardrobe
- Outfit Matching
- Recommendations
- Marketplace
- Matching Guide
- Rewards
- User Feedback

# Styling

AN APP FOR MATCHING OUTFITS

The "Simplicity First" approach to user experience and interaction design:

- Elimination: Replace text with icons.
- Organization and Concealment: Optimize the placement and categorization of user information.
- Delegation: Shift the input of occasion-related information from the user to the system.

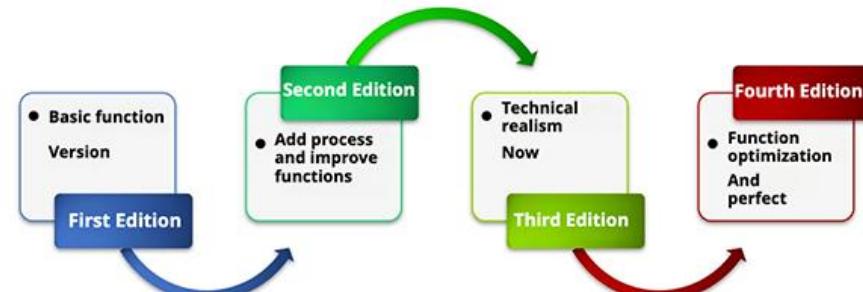


## Application of "Emotional" Design Methods in the Project

- **instinctive Level:** Stimulate users with visually appealing color tones that resonate with their preferences.
- **Behavioral Level:** Optimize the process of generating random outfit combinations to enhance software performance.
- **Reflective Level:** Design each feature with user feedback in mind, fostering an approachable and friendly brand image.

## Optimization Phase

- Reflective User Feedback and Validation: Conduct user surveys on the launched version to gather insights.
- Reflective Refinement and Improvements: Fix bugs and optimize existing features based on user feedback and data analysis.



# Styling

AN APP FOR MATCHING OUTFITS

User Information Module



Wardrobe Management Module



Outfit Matching Module



Recommendation Module



Matching Guide Module



Marketplace Module



Rewards



User Feedback Module



## OUTCOMES

Enable virtual outfit matching, Analyzed post-launch user data and conducted a usability test to refine the user flow resulting in a **25% increase** in user retention after launching the optimized version. achieving **150% of the target** for new user registrations post-launch.

# C-EASY

INTERACTIVE TV APPLICATION



## PROJECT SUMMARY

A simple TV remote control can no longer meet the operational needs of smart TVs. People require more natural and convenient human-computer interaction methods, such as voice control, gesture designed, achieving three-screen integration (TV screen, PC, and mobile terminal) and three-network integration (telecommunication network, broadcast television network, and the Internet) within a social grid.

## MAIN FEATURE

Its main feature is enabling bidirectional interaction while watching TV, with the core being that everyone watching the same program can participate in discussions remotely, enhancing the emotional value of the viewing experience.

## ROLE

- Research and Analysis
- UX Design

**具有社交功能的智能电视**  
北京大学软件与微电子学院交互媒体调研组

性別	男	女			
年齡	18-25 歲	26-30 歲	31-40 歲	41-55 歲	56 歲以上

一、您每天花多少時間在電視上  
 1. 1~7  
 2. 8~14  
 3. 15~21  
 4. 22~30  
 5. 31~40  
 6. 41~55  
 7. 56 歲以上

二、您平均每天花多少時間在電視上  
 1. 是  
 2. 否

三、您是否在電視上使用過哪些應用  
 1. 網絡  
 2. 人物、評論等  
 3. QQ/MSN 等聊天工具  
 4. 微博  
 5. 微信  
 6. 腾訊視頻  
 7. 爵士電影  
 8. 紙質電影  
 9. 优酷土豆  
 10. 淘寶電影  
 11. 爱奇藝  
 12. 哔哩哔哩  
 13. 其他

四、您是否在電視上使用過哪些應用  
 1. 網絡  
 2. 人物、評論等  
 3. QQ/MSN 等聊天工具  
 4. 微博  
 5. 微信  
 6. 腾訊視頻  
 7. 爵士電影  
 8. 紙質電影  
 9. 优酷土豆  
 10. 淘寶電影  
 11. 爱奇藝  
 12. 哔哩哔哩  
 13. 其他

五、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

六、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

七、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

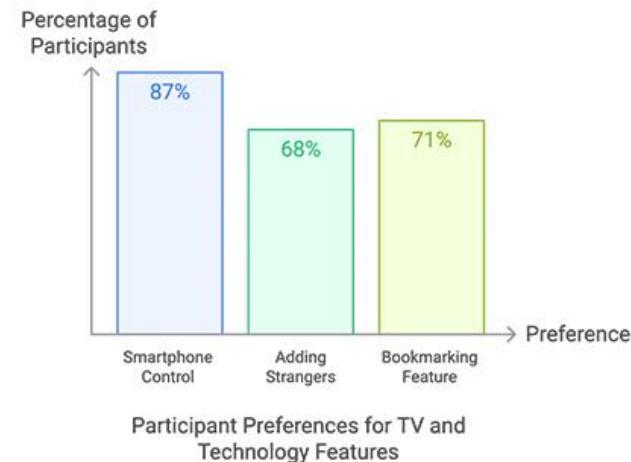
八、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

九、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

十、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

十一、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

十二、您是否在電視上使用過哪些應用  
 1. 是  
 2. 不是

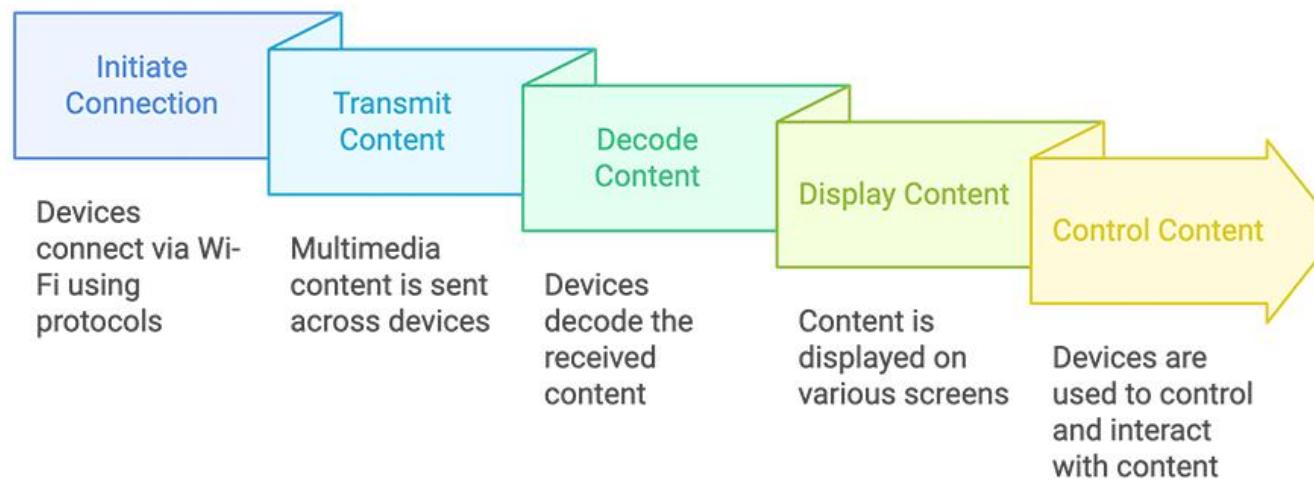


## RESEARCH AND ANALYSIS

Based on the design of the interactive TV application software, a survey of 100 participants was conducted. 87% showed strong interest in using their smartphones to control TV. 68% were willing to add strangers with shared interests in TV and movies as friends.

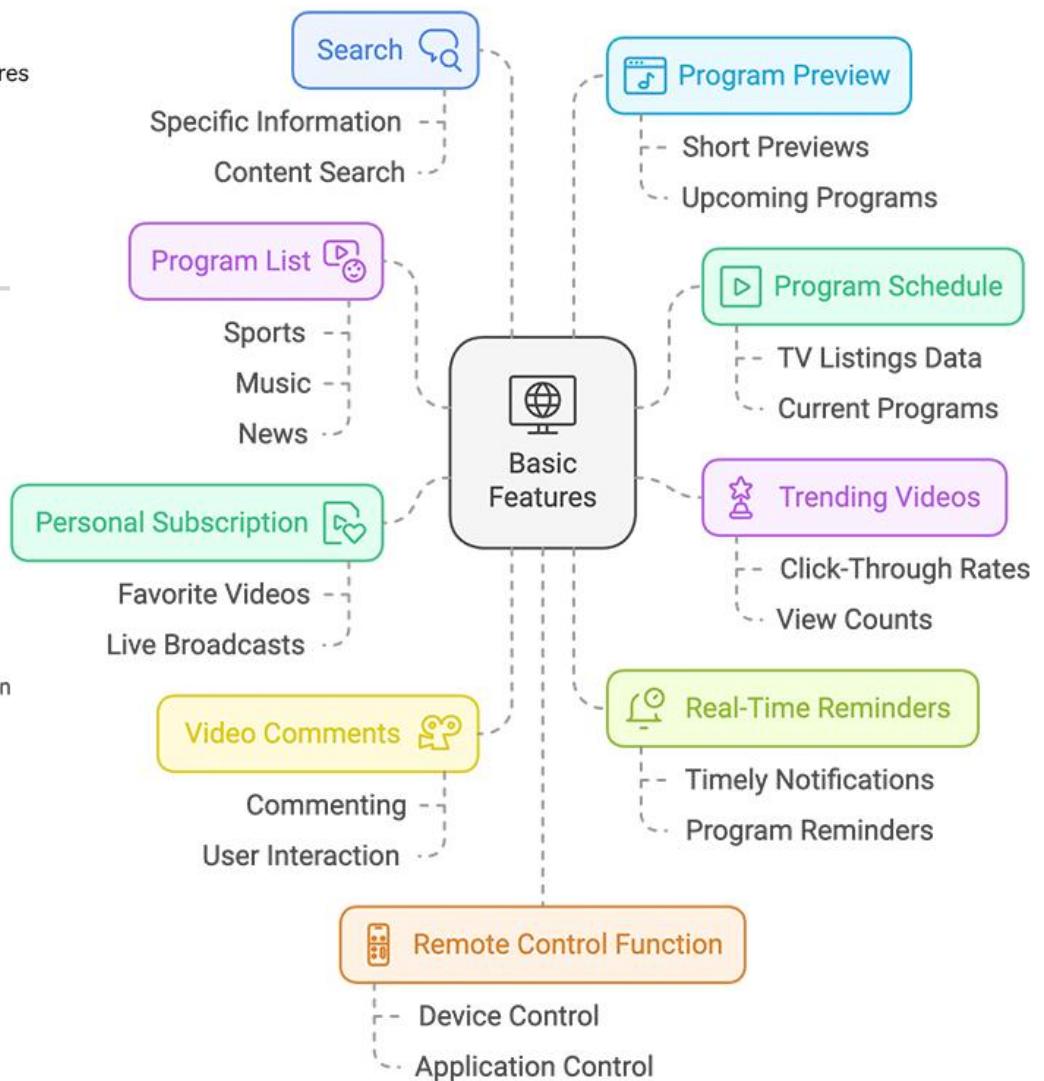
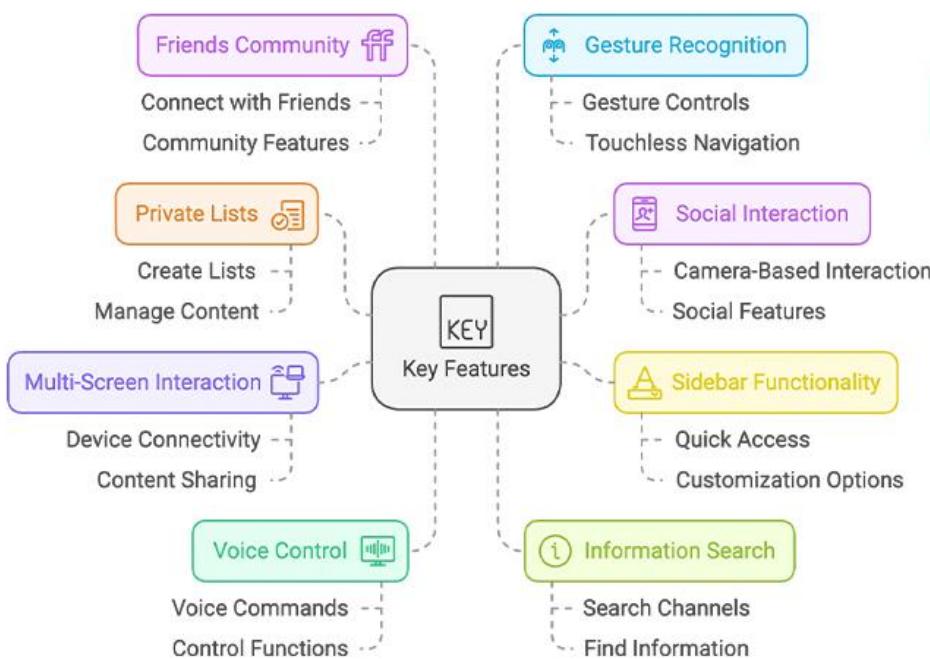
Therefore, when considering how TVs interact with users, we realized the interaction should not be limited to the TV as a medium. Instead, the medium can be expanded to include tablets, smartphones, and computer platforms.

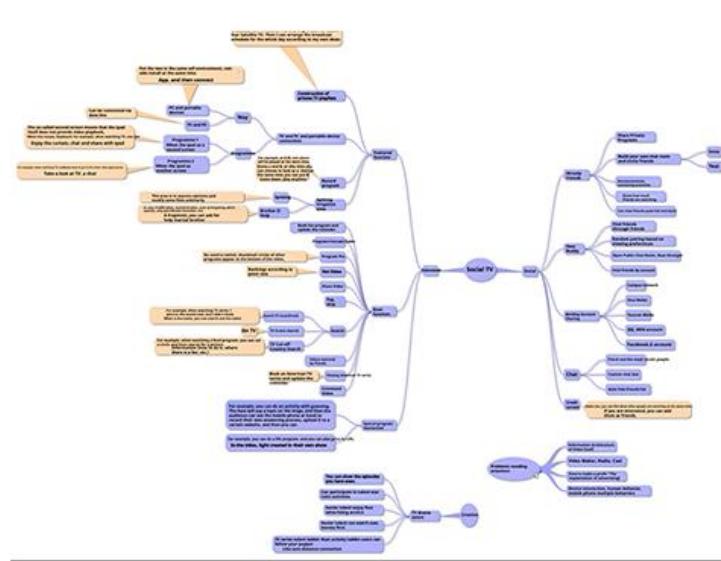
### Multi-Screen Interaction Process



## CORE FEATURES AND INNOVATIONS

- 10 Basic Features: Program Schedule、Trending Videos、Personal Subscriptions  
Program Categories、Video Comments、Real-Time Reminders  
Information Search、Program Preview、Remote Control Functionality、Social Features
- 8 Special Features: Create Personal Lists、Camera-Based Social Interaction  
Sidebar、Multi-Screen Interaction、Voice Control、Information Search  
Friend Community、Gesture Recognition





INFORMATION ARCHITECTURE



FINGER GESTURES



【大屏幕触摸屏】单手（左手）操作的覆盖区域范围

CAMERA-BASED GESTURES



# C-EASY

INTERACTIVE TV APPLICATION

## SKETCH PROTOTYPE

**At this time, after the LOGO appeared, the four labels that appeared in sequence while rotating were video, remote control, account number and more.**

**Video refers to television and some online video (TV series and movies only)**

**MORE: Refers to some of the features being developed**

**Remote control means that in the state of a TV or computer, this software can become a remote control and control.**

**Account refers to that users can directly associate with Xiaonei, Sina Weibo, Tencent Weibo, QQ, MSN account and other accounts to facilitate chatting and sharing. As well as video resource sharing, for example, I recently watched a video on AD, and then synchronized the viewing record to the server through my account. In another machine, I can continue to watch as long as I log in to the same account.**

**Hot Video**  
By analyzing click-through rate and subscription rate of all videos, we can get the top three hot videos every day and recommend them.

**Click on personal subscription**

**Personal subscription refers to the number of times of watching videos and times of viewing according to users' personal preferences. It can be modified directly at any time. For live programs, the programs will be prioritized for easy viewing.**

**Program forecast is based on the first three categories of TV forecast website to provide program schedule services for existing TV programs.**

**The program list refers to classifying existing program resources. For example, sports, news, etc., users can refer their favorite programs to the following categories according to their needs.**

**The colored parts are all classified names that are set by the system and cannot be changed. Contains entertainment, sports, news and other plates**

**This part can be moved. Currently, there are two ways to subscribe, one is to subscribe through RSS, and the other is to subscribe through the program list. When viewing the program list, if there is a new program, it will prompt whether to add it to the program list or Home page to subscribe. Different content will display different colors to indicate the difference, such as entertainment is crystal purple, news is ink blue, etc.**

**One logo**  
**从哪里来的信息呢**

**Overseas video refers to some foreign channels such as CNN, BBC, HBO, etc.**

**CCTV channel refers to CCTV's programs including CCTV1, etc.**

**Left Favorites is that I often watch programs to facilitate future inquiries.**

**Satellite channels refer to all local televisions in the country. Such as human satellite TV, Hebei Satellite TV, Jiangsu Satellite TV**

**Digital channels are digital television channels which may include premium channels.**

**The blue area refers to the thumbnails of each TV program, and you can directly enter the viewing interface after clicking.**

**This area is the program preview. We can see the content of the program through left and right swiping.**

**The yellow area refers to the name of each satellite TV channel, which can be selected by swiping left and right, such as Beijing Satellite TV, Hunan Satellite TV, etc.**

**Play button click is pause, click again is play. Swipe to the left is backward, hold for four seconds to fast backward; swipe to the right is to fast forward, hold for four seconds is to the next video.**

**Volume key is to control the volume.**

**Function keys for sharing functions: share, setAdd to favorites, add to the program and other functions.**

**When we designed the playback interface, we took a simple route, and the overall had only three buttons. They are the play button, the volume key and the function keys.**

**This is the search box. You can search for the video you want to see.**

**This is playing video**

**After clicking, the keyboard will pop up, and the background at the bottom will change to the search results. You can find out the content that was closed first. If it is playing, the searched video results will be pushed up under the video. If it is a normal interface, a new search results interface will appear.**

**This is the result of the search. The green area is the left and right to search more results.**

**After clicking on the video, you can directly enter the playback interface.**

**The "collision screen" function has two aspects: one is that it can pass through two devices at close range. Prepare for collision with each other, transmit data, etc. The other is to find users who are also shaking their mobile phones at the same time by shaking their mobile phones. They can randomly search for strangers to add friends, chat, watch videos he is watching recently, etc.**

**User who shake their mobile phones at the same time can click on the avatar to perform the next operation, such as viewing detailed information and adding friends.**

**Refresh button**

**The name of the video the user is watching.**

**The whole interface can be dragged around to see more users.**

**Social network refers to the application of using social networking site accounts, sharing, chatting and interacting, which can facilitate users to communicate and interact with friends while watching videos.**

**The interface that drag left and right, watch more, log in by clicking logo, register and other operations**

**On behalf of the various social networking sites, such as school, microblog, etc.**

## PROTOTYPE



System Startup Screen



Homepage Cover



Program List



Program Schedule



Program Schedule



Search Interface



Search Results Interface



Right Side - Video Playback Control Buttons



Personal Customization



Account Login



Social Media Login



Shut Down

THANK YOU

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