



turbotax

credit karma

quickbooks

mailchimp

# iOS Mobile Meetup at Intuit India

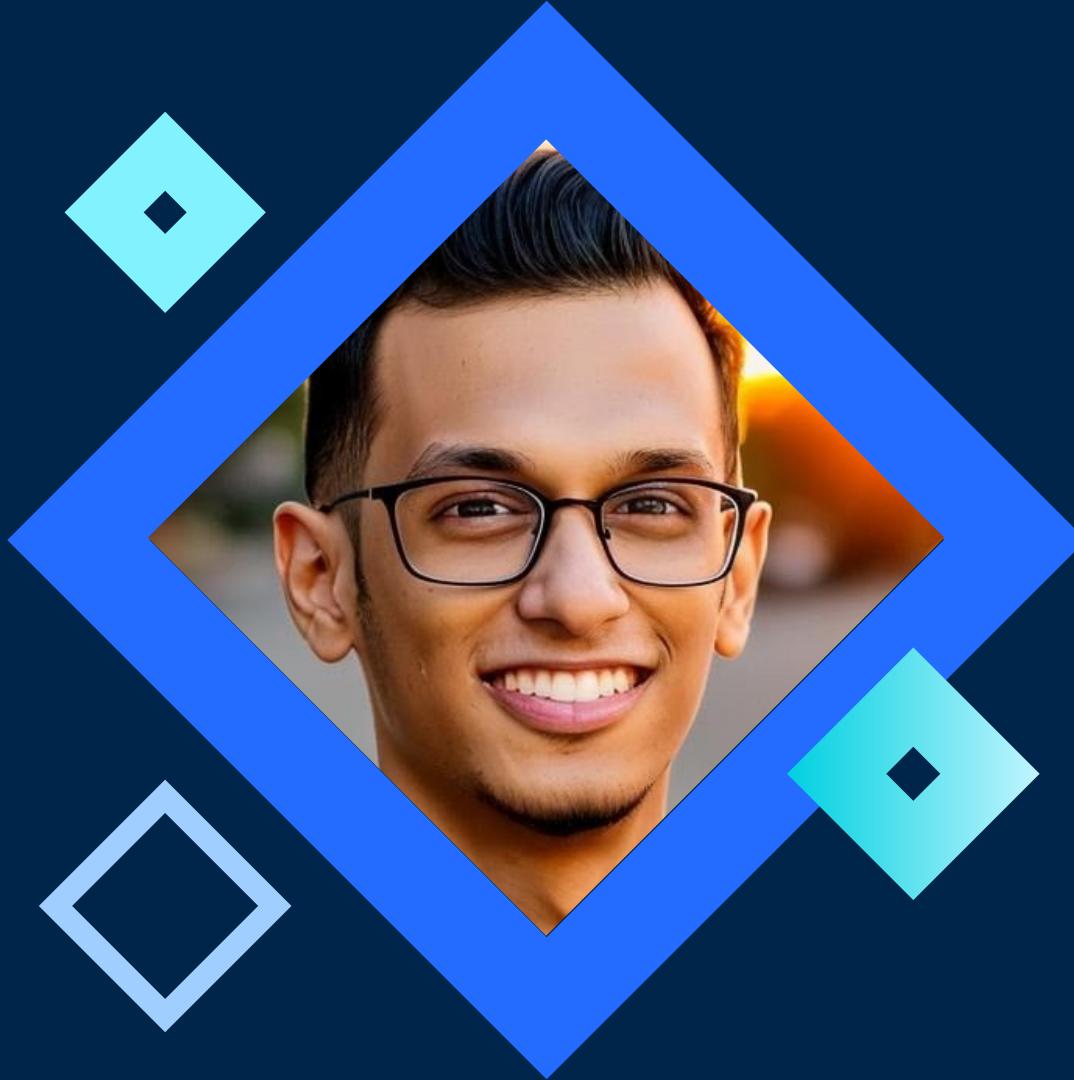
## Powered by Tech Culture Champions Community

## Join our **Talent community** to receive

- Real-time updates on Intuit's hottest open roles
- The latest Intuit news specific to your field and interests
- Invitations to special live events, meetups, webinars, and more hosted by Intuit



Scan me!



## Welcome note

**Speaker: Akashlal Bathe, Software Engineer at Intuit**

**INTUIT**



**WE** | are powering  
prosperity  
around the world

# Who we are

Intuit is the **global financial technology platform** that powers prosperity for the people and communities we serve.

**40**

Years of powering prosperity around the world  
(Established in 1983)

**18200+**

Employees across 20 locations in 9 countries

**100M**

Customers who leverage Intuit products to overcome their financial challenges

**\$14.4B**

In annual revenue (2022) and part of the Fortune 500

20 offices in 9 countries

History of self-disruption and re-imagination

**CANADA**  
Toronto  
Edmonton

**USA**  
Mountain View  
San Diego  
Plano  
Reno  
Tucson  
Boise  
Fredericksburg  
Washington DC  
Eagle  
Woodland Hills  
San Francisco  
New York City  
**INTUIT**

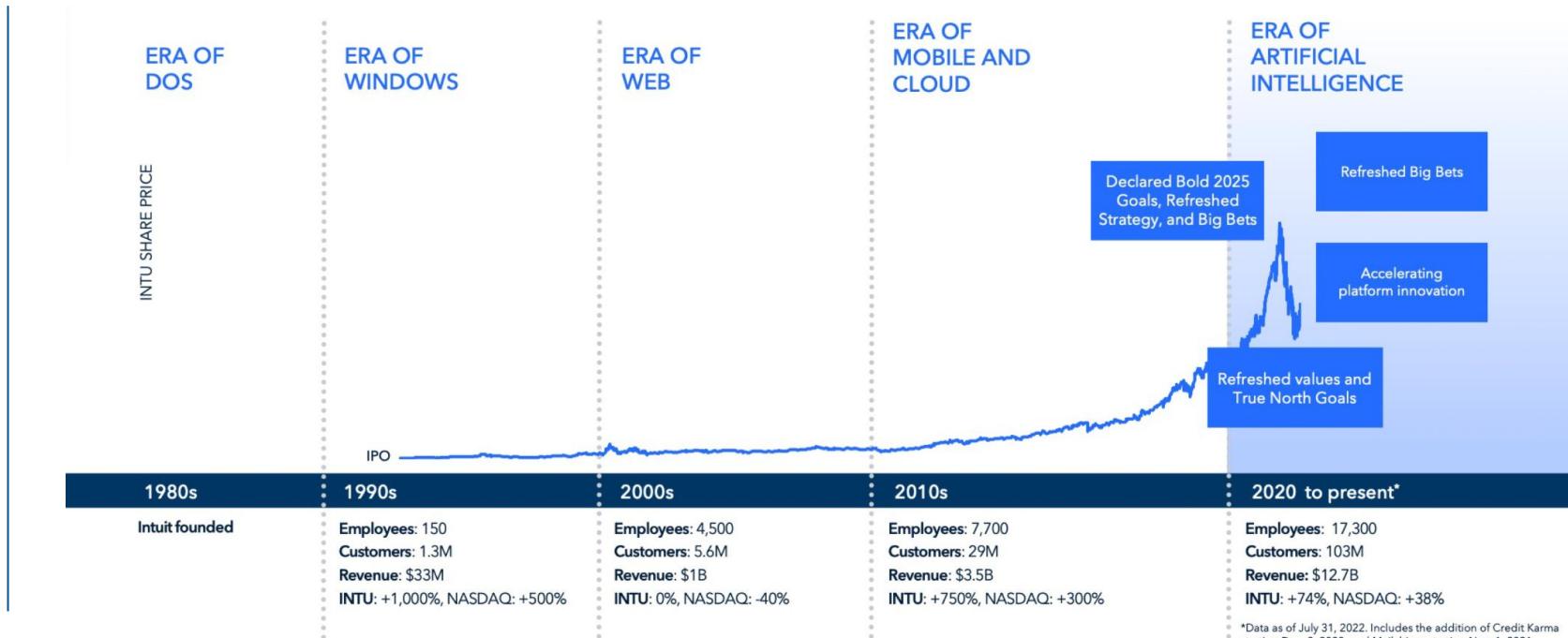
**FRANCE**  
Paris

**UNITED KINGDOM**  
London

**ISRAEL**  
Petah Tikvah

**AUSTRALIA**  
Sydney

**INDIA**  
Bangalore



Intuit Confidential and Proprietary

# What we do

Intuit is the global financial technology platform that powers prosperity for the people and communities we serve.

We work on **Mobile, Web and Cloud solutions** that help customers make more money, eliminate work and give them complete confidence.



Smartest business tools for the world's hardest workers



Everything you need to get your taxes done right



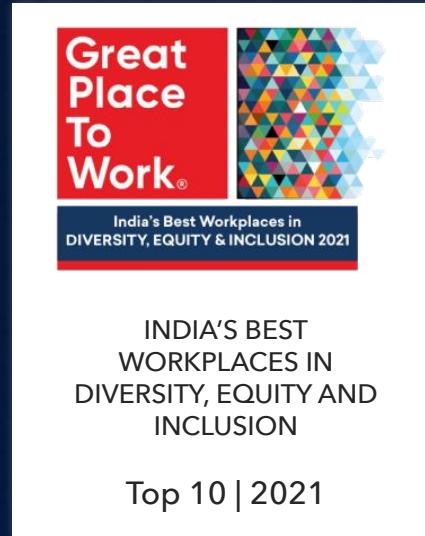
Free Credit score and Credit reports



All in one marketing platform



# Recognized as one of the India's Leading Companies



INDIA'S BEST  
WORKPLACES IN  
DIVERSITY, EQUITY AND  
INCLUSION

Top 10 | 2021



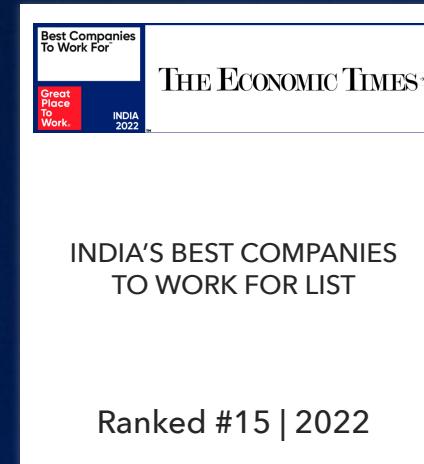
TOP 10 BEST COMPANIES  
TO WORK FOR WOMEN

Top 10 | 2021



ANALYTICAL INDIA  
MAGAZINE'S BEST FIRMS  
TO WORK FOR DATA  
SCIENTISTS

Ranked # 7 | 2023



INDIA'S BEST COMPANIES  
TO WORK FOR LIST

Ranked #15 | 2022



THE ECONOMIC TIMES

2022

#15

Ranked #15 In India

2020

#1

Ranked #1 In India

2019

#2

Ranked #2 In India

2018

#2

Ranked #2 In India

2017

#1

Ranked #2 In India

# Recognized as one of the World's Leading Companies



FORTUNE BEST COMPANIES TO WORK FOR

Ranked #14 | 2023



FORTUNE BEST WORKPLACES IN TECHNOLOGY

Ranked #11 | 2022



WORLD'S MOST ADMIRE COMPANIES: SOFTWARE INDUSTRY

Ranked #6 | 2019



PEOPLE MAGAZINE COMPANIES THAT CARE

Ranked #7 | 2020

# Mobile @

# Intuit



#mobile

## Mobile Ecosystem

The Mobile ecosystem is diverse at Intuit IDC with product teams building solutions that our consumers love. Complementing each other we have platform teams building on central tech capabilities that accelerate our growth as a single unit.

This ecosystem has been growing year over year with focus on building a mobile center of excellence that not only helps make our products better but also looks at ways to innovate and create new capabilities and features for our consumers.

# What is the Tech Culture Champions Community?

A grassroots community of Intuit technologists that focus on improving our tech culture to enable engineers to learn, grow, connect, and scale.

# Day 1

# Mindset



#mobile

Food for thought:

1. Problems you are solving for your customers, can it be enhanced and/or simplified with AI?
2. Is there anything you would like to do faster, with AI?
3. How are you preparing yourself for the AI era

**Every day is a new day!**

## Today's Agenda:

Agenda	Topic
Kick-off Keynote	By Akashlal Bathe, Software Engineer at Intuit
Session 1 on GenAI Mobile Technology and Patterns: Streamline processes with ease (virtual)	By Waseem Syed Senior Staff Software Engineer & Mobile architect at Intuit
Session 2 on ML in iOS	By Swapnanil Dhol iOS Engineer at Loyalty Juggernaut
Session 3 on Enhancing Xcode with AI: Building smarter editor extensions	By Pavan Itagi Senior Engineering Manager & Mobile Application Architect at Code and Theory
Wrap-up Thank you note	By Danish Ahmed Ansari, Staff Software Engineer & Mobile Track Lead at Intuit

# Topic: GenAI Mobile Technology and Patterns: Streamline processes with ease (virtual)

**Speaker 1: Waseem Syed, Senior Staff Software Engineer and a Mobile architect at Intuit**



# About me



I'm a Senior Staff Software Engineer at Intuit with over 17 years of experience in full-stack software development, specializing in mobile. In my current role, I lead the GenAI mobile application development in creating innovative solutions. I have a strong passion for technology and I enjoy sharing my knowledge in mobile architecture through blogging, webinars, and patented innovations. Outside of work, I enjoy traveling and playing cricket. I'm based in Mountain View, California

# Presentation Disclaimer

Please note that this presentation is intended as a general overview of how Apple's frameworks and other general software development patterns can be leveraged for developing GenAI experiences on mobile, and does not represent any specific use cases of Intuit.

# Agenda

---

GenAI Mobile Platform

---

Renderers and Experiences

---

Multi modality Input

---

Actions Framework

---

Derived Context

---

# GenAI Mobile Platform



# GenAI Mobile Platform

GenAI Mobile platform provides foundational elements to quickly build and deploy AI experiences with:

- **Consistent** user experiences across devices and apps
- **Efficient** development process avoiding code duplication
- **Out-of-the-box** tooling and feedback loops

Build once, reuse everywhere

# Renderers

Specify the desired format for GenAI responses

# Fuego Response Format(FrF)

Platform agnostic DSL

Write once, render everywhere using [Player](#)



Server Driven Navigation

Bring your own design system

Plugin Ready

# How does it work?

## Fuego Response

```
asset : {  
  
    id : "action-view"  
  
    type : "action"  
  
    value : "Update a purchase order"  
  
}
```

## Player Asset

```
// Create AssetView  
struct AssetView: View {  
    @ObservedObject var model: AssetViewModel<AssetData>  
  
    var body: some View {  
        Button(action: action) {  
            Text("Update a purchase order")  
            .overlay(Capsule())  
        }  
    }  
  
    // Create Asset  
    class Asset: UncontrolledAsset<AssetData> {  
        override var view: AnyView {  
            AssetView(model: model).eraseToAnyView()  
        }  
  
        // Register Asset  
        player.assetRegistry.register(["type": "action", for: ActionAsset.self])  
    }  
}
```

## Rendered Button



Update a purchase order

# Markdown

**Structural elements** - headings, lists, tables

**Readability** - highlight key information

- Example: Vendor has a net income of **\$884,370.85** with a gross profit of **\$918,348.01**.

## Other renderers

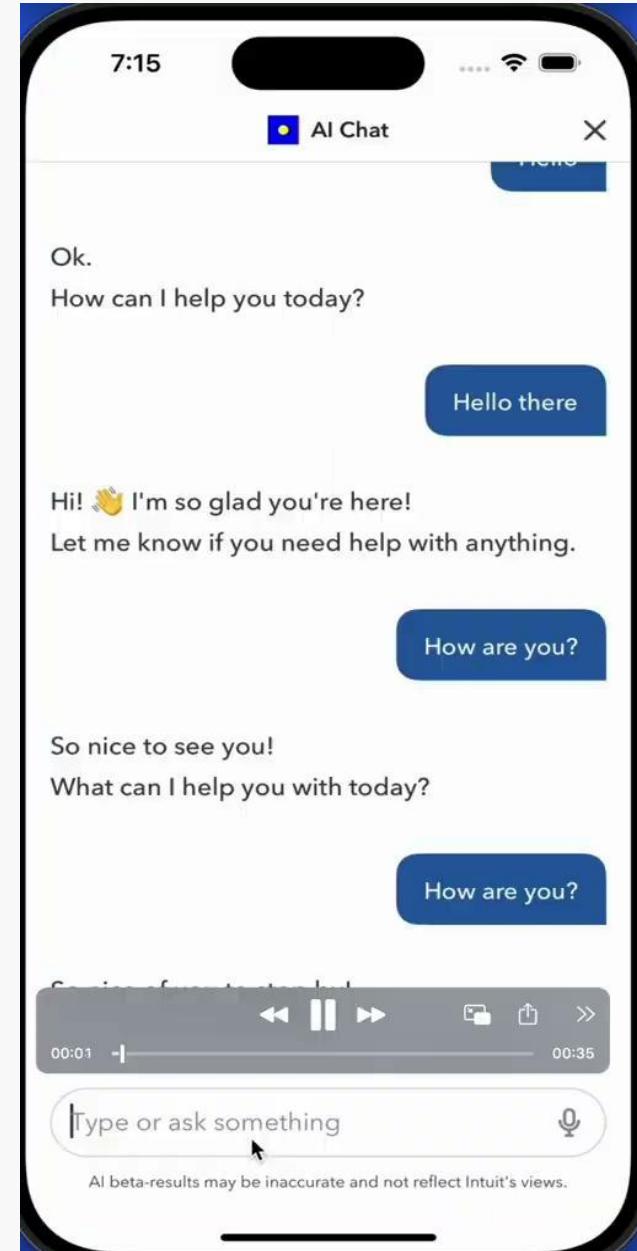
- JSON
- Embedded web
- Plain text

# Experiences



# Assistive Chat

- Foundation UI elements and support for custom [renderers](#)
- Configurable GPT models with ability to retain [conversation history](#)
- Consistent control and branding for seamless experience
- Configurable app theme, navigation, and disclaimer text



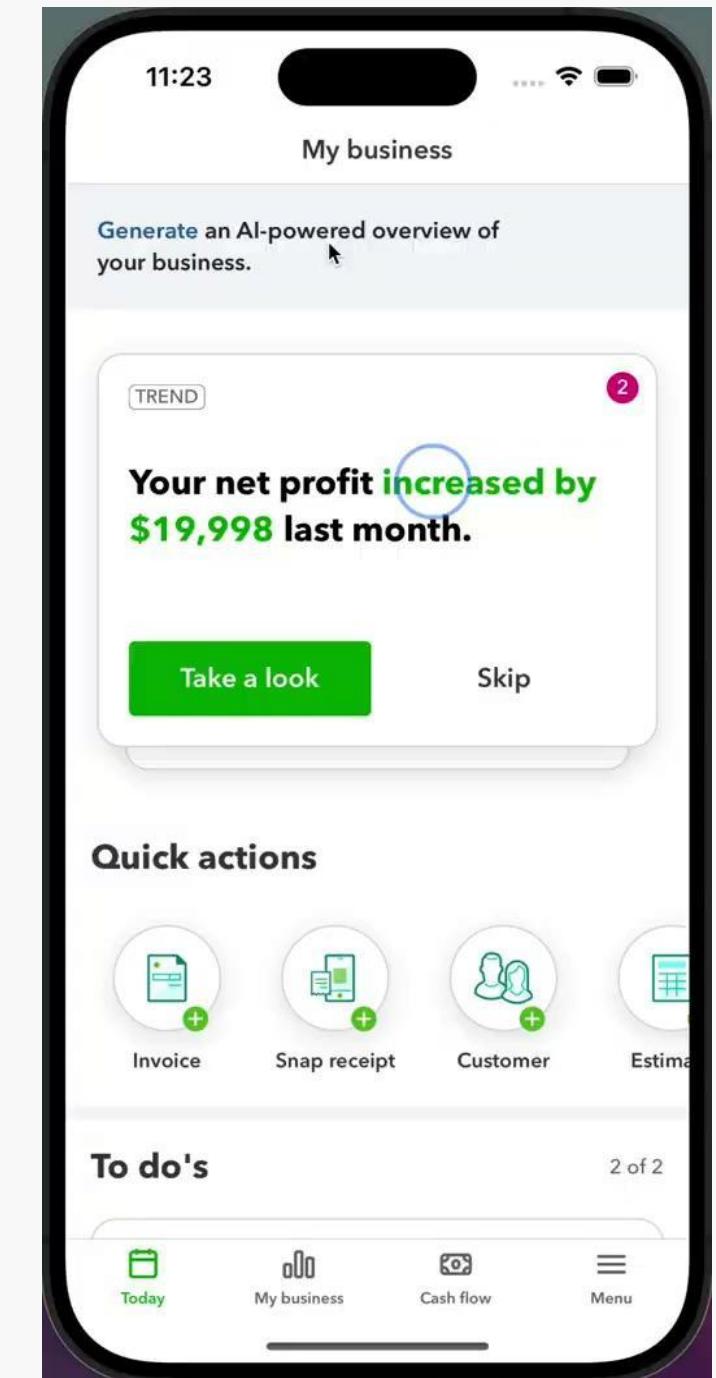
# Personalized Embedded Summaries

Contextual summarization

Iteratively configure content preferences with  
**Feedback loop**

**In-depth** analysis using:

- Itemized statements
- Graphs



# Multi Modality Input

Diverse sensory inputs for improved natural interaction

# Voice Input

**AVFoundation** to capture and process audio

**Speech** framework for recognition and conversion to text

Real-time transcription

Localization

Out-of-the-box analytics and feedback

```
private var audioEngine: AVAudioEngine?  
private var request: SFSpeechAudioBufferRecognitionRequest?  
private var task: SFSpeechRecognitionTask?  
private let recognizer: SFSpeechRecognizer?  
@Published public var transcript: String?  
  
private func transcribe() {  
    ...  
    let (audioEngine, request) = try Self.prepareEngine()  
    self.audioEngine = audioEngine  
    self.request = request  
    self.task = recognizer.recognitionTask(with: request, resultHandler: { [weak self] result, error in  
        self?.transcript = result?.bestTranscription.formattedString  
    })  
    ...  
}
```

# Image Input

Apple's **Vision framework** for image recognition  
and conversion to text

Localization to support multiple languages

Support for AI along with Apple's on-device LLMs

Out-of-the-box analytics and feedback

```
private func extractText(from image: UIImage) {
    // Create a vision request for text recognition
    let request = VNRecognizeTextRequest { (request, error) in
        guard let observations = request.results as? [VNRecognizedTextObservation] else { return }
        // Extract the text from the observation
        let recognizedStrings = observations.compactMap { observation in
            observation.topCandidates(1).first?.string
        }
        userInput = recognizedStrings.joined(separator: " ")
    }
    // Set the recognition level to accurate
    request.recognitionLevel = .accurate
    // Create an image request handler with the input image
    let imageRequestHandler = VNImageRequestHandler(cgImage: image.cgImage!, options: [:])
    // Perform the text recognition request using the image request handler
    try? imageRequestHandler.perform([request])
}
```

# Raw Text

Text gathered from sources like emails,  
tasks, addresses etc to be sent to LLMs

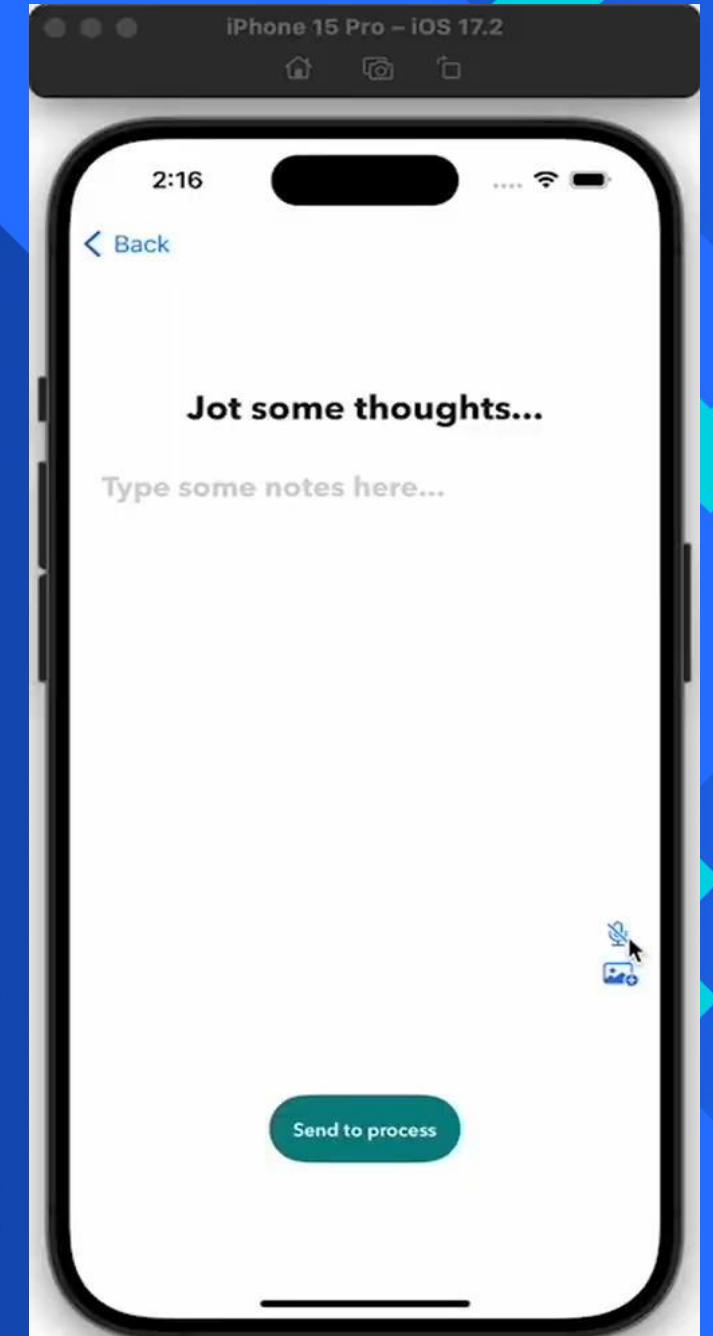
Dear Sir/Madam ,

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed aliquam massa id nisl bibendum bibendum. Curabitur non lacus et sapien dapibus maximus vitae vel nulla.

Sincerely,

[Loren Epsom]

# Multi Modality Input to Actions



# Actions Framework



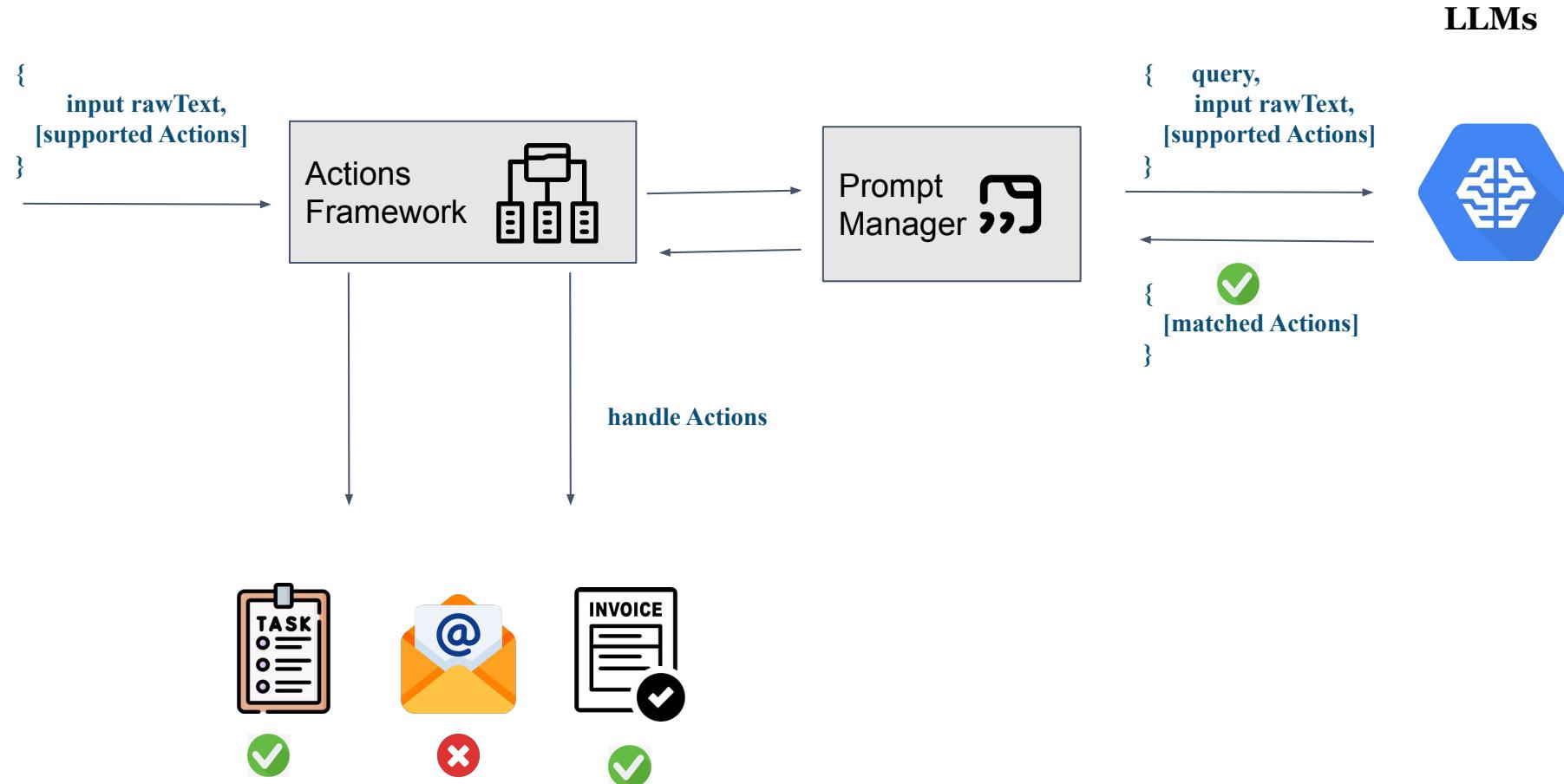
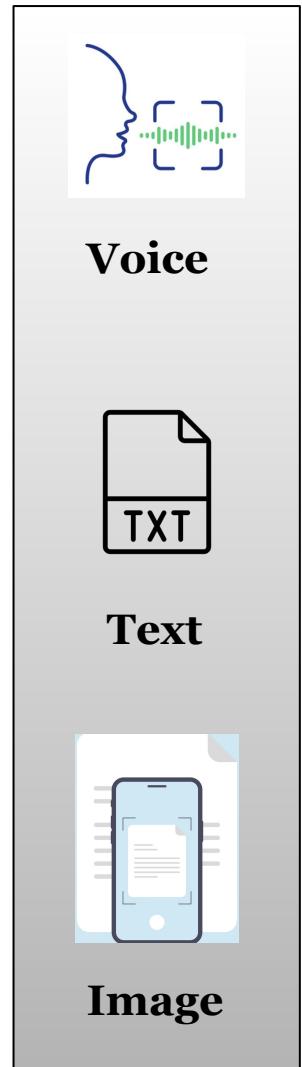
# Actions Framework

Converts raw text into actions

- **Clients:** configure library with supporting actions and provide input
- **Prompt Manager:** hosts the query prompt and moderation rules
- **LLMs:** classify the text to actions and populate the data models
- **Actions Framework:** orchestrate actions like *creating an invoice, of an invoice, drafting an email, creating a task, and more*

# Multi Modality

## Input



# Actions

```
// Action
```

```
protocol AIAction: Codable {  
    associatedtype AIActionModel: Codable  
    var actionName: String { get set }  
    var model: AIActionModel { get set }  
}
```

```
// Email Action
```

```
struct EmailAction: AIAction {  
    typealias AIActionModel = Email  
    var actionName: String = "Email"  
    var model: Email  
}  
struct Email: Codable {  
    var recipient: String?  
    var sender: String?  
    var subject: String?  
    var body: String?  
}
```

```
// Invoice Action
```

```
struct InvoiceAction: AIAction {  
    typealias AIActionModel = Invoice  
    var actionName: String = "Invoice"  
    var model: Invoice  
}  
struct Invoice: Codable {  
    var invoiceId: Int?  
    var itemsList: [String]?  
    var billedTo: String?  
    var total: Double?  
}
```

# Prompt Vs Output

Prompt	Output
<pre>"rawText" : "Freddie 898-787-8787 Groceries, tomorrow", "actions" : [ {   "actionName" : "Contact Card",   "isAMatch" : false,   "model" : {     "base" : {       "firstName" : "",       "lastName" : "",       "phoneNumber" : 0     }   } }, {   "actionName" : "Email",   "isAMatch" : false,   "model" : {     "base" : {       "recipient" : null,       "sender" : null,       "subject" : null,       "body" : null     }   } }  {   "actionName" : "Task",   "isAMatch" : false,   "model" : {     "base" : {       "taskName" : "",       "taskDate" : "",       "isCompleted" : false     }   } }, {   "actionName" : "Task" } ]</pre>	<pre>```json {   "rawText" : "Freddie 898-787-8787 Groceries, tomorrow",   "actions" : [     {       "actionName" : "Contact Card",       "isAMatch" : true,       "model" : {         "base" : {           "firstName" : "Freddie",           "lastName" : null,           "phoneNumber" : 8987878787         }       }     },     {       "actionName" : "Email",       "isAMatch" : false,       "model" : {         "base" : {           "recipient" : null,           "sender" : null,           "subject" : null,           "body" : null         }       }     }   ] } ```</pre>

# Derived Context

Inferred query/prompt generation

# Descriptors

# Descriptors

## Static description

- Influence the query with description of UI
- Call out predetermined focus areas

## Dynamic values:

- Data fetched from the backend

```
// Screen descriptor

let inventoryDictionary: [String: Any] = getInventory()

let screenDescriptor = "The screen <screen name> provides
a real-time snapshot of available stock. It guides the
decision-making process, helping the business stay
efficient, profitable and customer-friendly. The current
inventory status is as follows: \($inventoryDictionary)"
```

## Query

Generate insights that help me understand the state of my business using the following data:

Inventory Screen <description>. Here is the current inventory

item1: 20  
item2: 30  
item3: 2  
item6: 1

Expenses screen <description> Here is the list of expenses:

service1: \$200  
service 20: \$500  
service 30: \$1500

Revenues screen <description>. Here is the list of revenues:

ABC financial: \$5500  
XYZ corp: \$ 1050  
ZE inc: \$ 2500

## LLM Response

### 💡💡 Key insights 💡💡 :-

Overall, your business is running in a ↗ **profitable** state

### 💰 Revenues

- You are making the highest profits on the stock ↗ ABC financial
- Revenues increased by ⬆️ 30% compared to last month
- Your operating costs decreased by ⬇️ 10% compared to last month

### ⚠️ Low Inventory:

- Items item3 and item6 are running out fast. Make sure to replenish the inventory

### 💸 Expenses:

- You are spending the highest amount of money on gasoline

Hope the insights are useful! 👍

# Adaptive Content Management

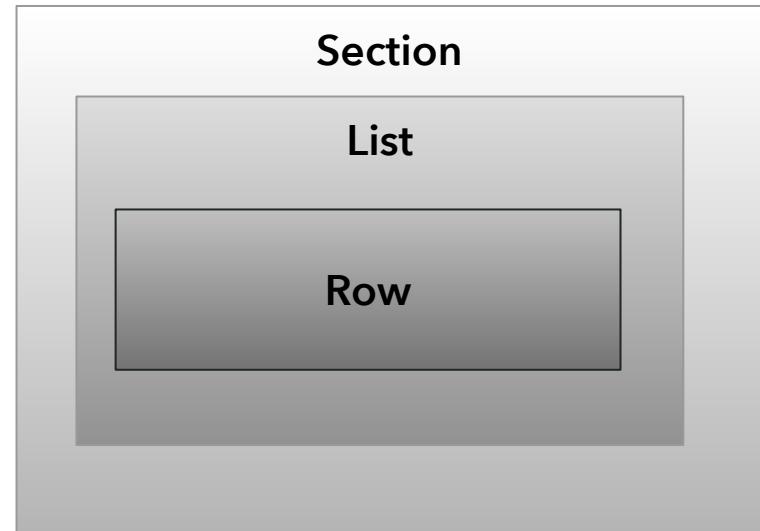
Generate content assembling parts of screens in Server Driver UI

# Adaptive Content Management

Screens are JSON representation of UI elements in SDUI

- **Cache** stores network call responses for business logic
- **LLMs** execute upon meeting predefined policies
- **Policies** are configured by stakeholders based on factors like *user entitlements, behavior patterns, token counts, etc*
- **Server** streams responses proactively using rSocket/gRPC/Http2

**UI representation**



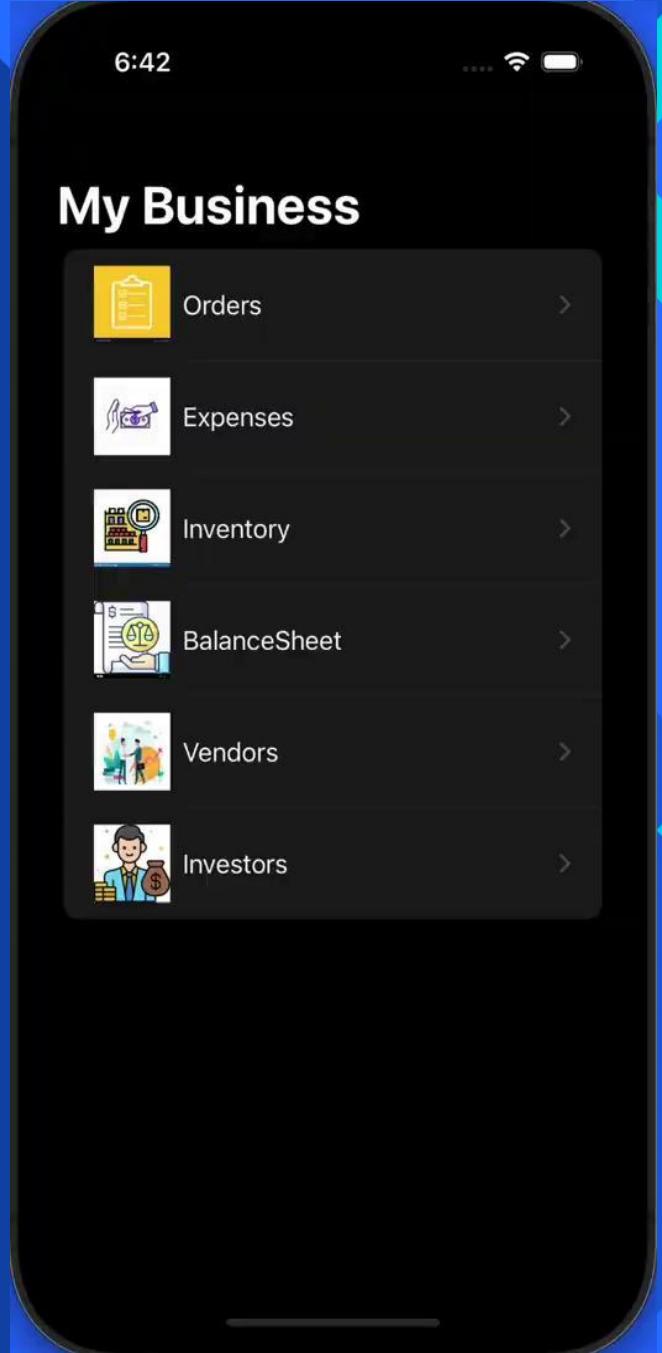
## Query

Return the items that need my attention with screen name as key and items as values using the following data ...

## LLM response

```
{  
    "OrdersScreen":{  
        "items":[  
            "Total number of orders"  
        ]  
    },  
    "ExpensesScreen":{  
        "items":[  
            "Most expensive material"  
        ]  
    },  
    "InventoryScreen":{  
        "items":[  
            "Expiring ingredients"  
        ]  
    }  
}
```

# Adaptive Content Management



# Summary

- **GenAI mobile platforms** foster faster innovation and prevent duplication
- **Renderers** configure the response format from LLMs
- **Personalized insights** learn and adapt from user feedback to enhance the user experience
- **Actions framework** proactively generates contextual actions from multi-modality sensory inputs
- **Adaptive content management** builds AI-driven summarization reusing UI elements in a derived context

# Q&A



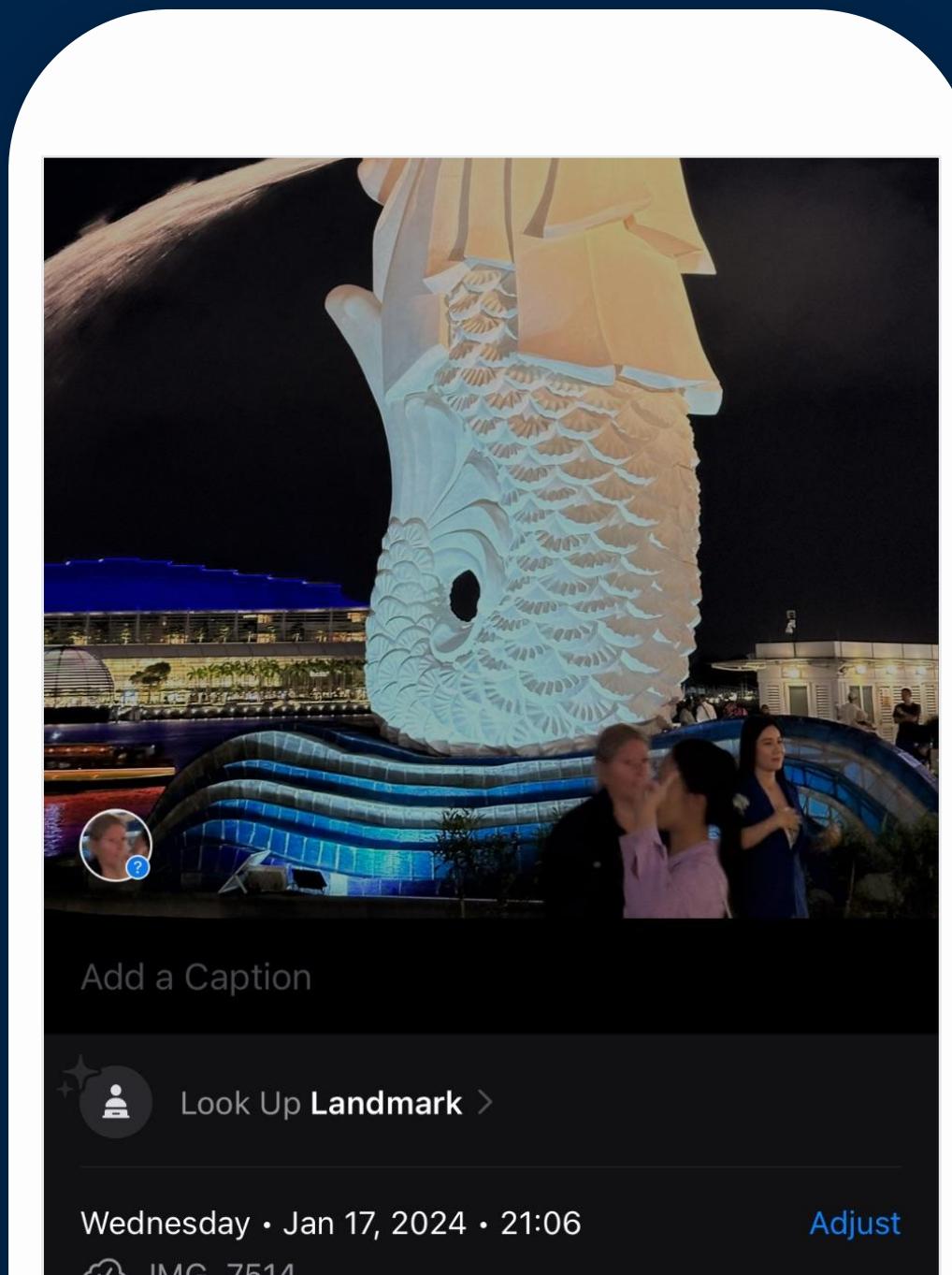
Topic: ML in iOS Apps

**Speaker 2: Swapnil Dhol, iOS Engineer at Loyalty Juggernaut**

# Agenda

1. Where Apple uses ML within iOS and public Vision/ML APIs
2. Native ML Workflow in iOS apps - WWDC 2021 Submission
3. Transfer Learning
4. Tabular Regression and available built-in training algorithms.
5. Text Classification

# Subject Detection



Add a Caption



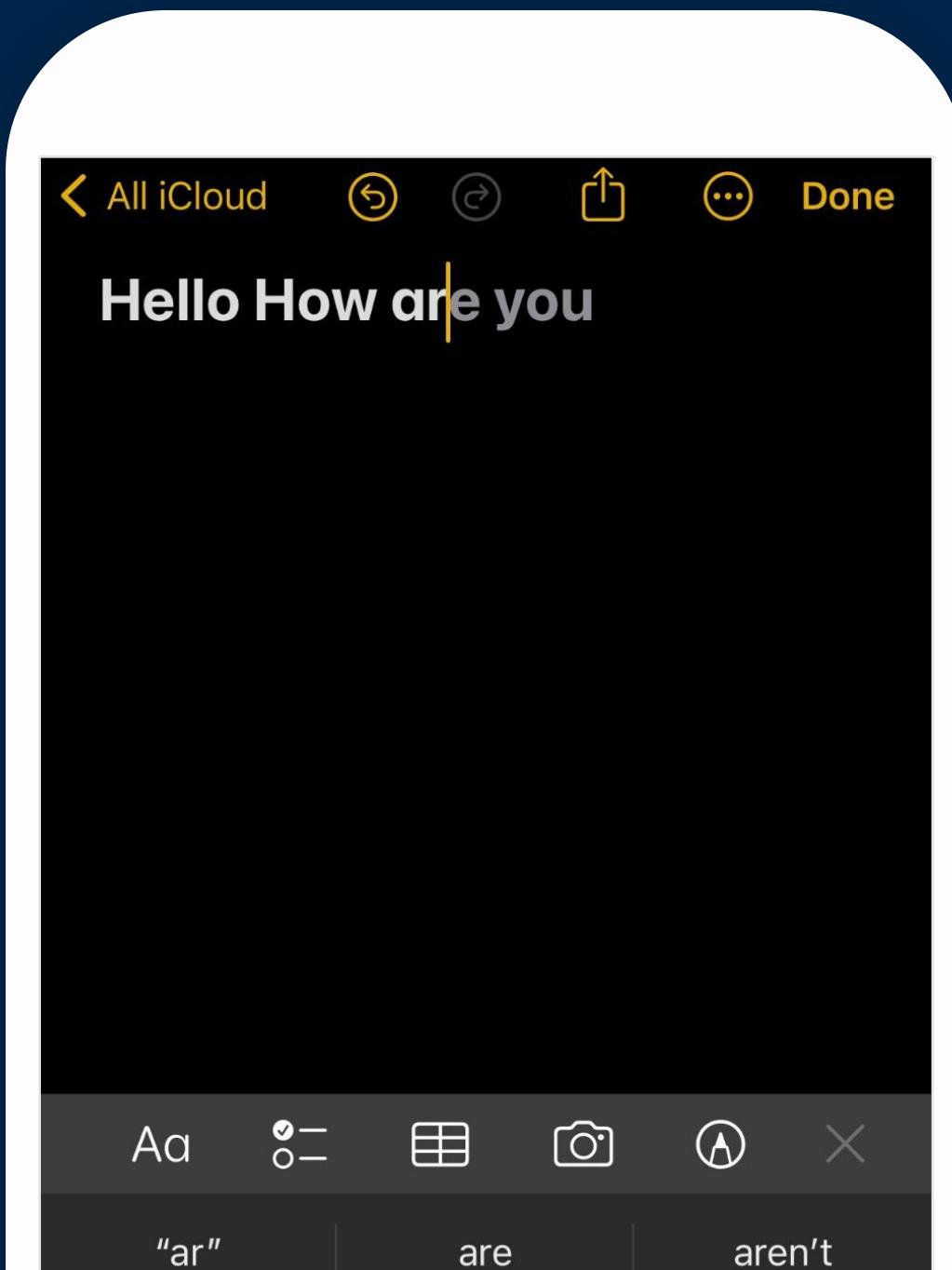
Look Up Landmark >

Wednesday • Jan 17, 2024 • 21:06

Adjust

IMG\_7514

# Next Word Prediction



# Vision and VisionKit

The screenshot shows a dark-themed web browser window displaying the Apple Developer documentation for the `ImageAnalyzer` class. The left sidebar contains a navigation tree for VisionKit, with `ImageAnalyzer` expanded to show its properties and methods. The main content area is titled `ImageAnalyzer` and describes it as an object for finding interactable items in images. It includes support notes for iOS 16.0+, macOS 13.0+, Mac Catalyst 17.0+, visionOS 1.0+, and iPadOS 13.0+. A code block shows the declaration: `final class ImageAnalyzer`. Below this is an 

## Overview

 section that explains how to use the `ImageAnalyzer` class to find items in images.

Content recognition and interaction in images

↳ Enabling Live Text interactions with images

↳ **ImageAnalyzer**

- Handling availability
- ↳ **P** class var `isSupported`: Bool
- ↳ **P** class var `supportedTextRecognitionLanguages`: [String]

Creating image analyzers

↳ **M** `init()`

Configuring image analyzers

↳ **S** `ImageAnalyzer.Configuration`

Finding items in images

↳ **M** `func analyze(UImage, configuration: ImageA...`

↳ **M** `func analyze(NSImage, orientation: CGImage...`

↳ **M** `func analyze(CGImage, orientation: CGImage...`

↳ **M** `func analyze(CVPixelBuffer, orientation: CGIm...`

↳ **M** `func analyze(ClImage, orientation: CGImageP...`

↳ **M** `func analyze(UImage, orientation: UImage.Or...`

↳ **M** `func analyze(imageAt: URL, orientation: CGIm...`

↳ **C** `ImageAnalysis`

↳ **C** `ImageAnalysisInteraction`

↳ **P** `ImageAnalysisInteractionDelegate`

Documentation / VisionKit / ImageAnalyzer

Language: Swift API Changes: None

## Class

# ImageAnalyzer

An object that finds items in images that people can interact with, such as subjects, text, and QR codes.

iOS 16.0+ macOS 13.0+ Mac Catalyst 17.0+ visionOS 1.0+ iPadOS 13.0+

```
final class ImageAnalyzer
```

## Overview

To use an `ImageAnalyzer` object, first create an `ImageAnalyzer.Configuration` object, and specify the types of items you want to find in an image. Then pass the image you want to analyze and the configuration object to an `ImageAnalyzer` object using the `analyze(_:_configuration:)` or similar method. This method returns an `ImageAnalysis` object that contains all the data VisionKit needs to implement the Live Text interface.

Next, show the Live Text interface. For iOS apps, set the interaction object of the view that contains the image to an instance of `ImageAnalysisInteraction` and set its `analysis` property to the `ImageAnalysis` object. To enable interactions with the image, set the interaction object's `preferredInteractionTypes` property. To customize the Live Text interface, set the `ImageAnalysisInteraction` object's `delegate` property and implement the `ImageAnalysisInteractionDelegate` protocol methods.

# ML Workflow in iOS Apps



**Train  
Model**



**Test  
&  
Validate  
Model**



**Integrate**

# CreateML



[developer.apple.com](https://developer.apple.com)

Image Classification Project

MyImageClassifier

Model Sources (1)

+ MyImageClassifier 1

Data Sources

No Data Sources

Train Settings Training Evaluation Preview Output Activity

Data

Training Data Validation Data Testing Data

Auto Split from Training Data

Choose Automatic None

Parameters

Feature Extractor Image Feature Print V1

The feature extractor model scales the input image to 299 x 299 and yields a feature embedding size of 2048.

Model Availability macOS 10.14+ iOS 12.0+ tvOS 12.0+

Iterations 25

Augmentations Add Noise  
Blur Crop Expose

Training data required

-- -- --

Training Validation Testing

Activity Apr 26, 2024

Model Source Created 7:22 PM

MyImageClassifier 1

Project Created 7:22 PM

MyImageClassifier



Original



Horizontally Flip



Crop



Contrast



Flip + Contrast

[developer.apple.com](https://developer.apple.com)

# CoreML

# What is CoreML

- Core ML is an Apple framework to integrate machine learning models into your app. Core ML provides a unified representation for all models.
- Your app uses Core ML APIs and user data to make predictions, and to fine-tune models, all on the user's device. Core ML optimizes on-device performance by leveraging the CPU, GPU, and Neural Engine while minimizing its memory footprint and power consumption.
- Running a model strictly on the user's device removes any need for a network connection, which helps keep the user's data private and your app responsive.

[developer.apple.com](https://developer.apple.com)

## **CoreML Tools**

```
pip install -U coremltools
```

Convert machine learning models from third-party libraries to  
the Core ML format.

# Human Hand Pose Estimation

8:15 PM Mon 19 Apr

X □

Edit

# Inclusivity

Chapters

- Introduction
- Introduction-CutScene
- Introduction

Alphabets

- Alphabets Hand-Pose Rec...
- Alphabets Recall Quiz

Phrases

- Phrases Hand-Pose Reco...
- Phrases Recall Quiz

Conclusion

- Final Quiz

Source Code

- Main  
Alphabets Hand-Pose Recognition
- UserModule

< Alphabets Hand-P... > + ...

### Alphabet Recognizer using Vision

The system of ASL has well-defined hand-poses for the set of English alphabets. They are presented with a single hand in various poses.

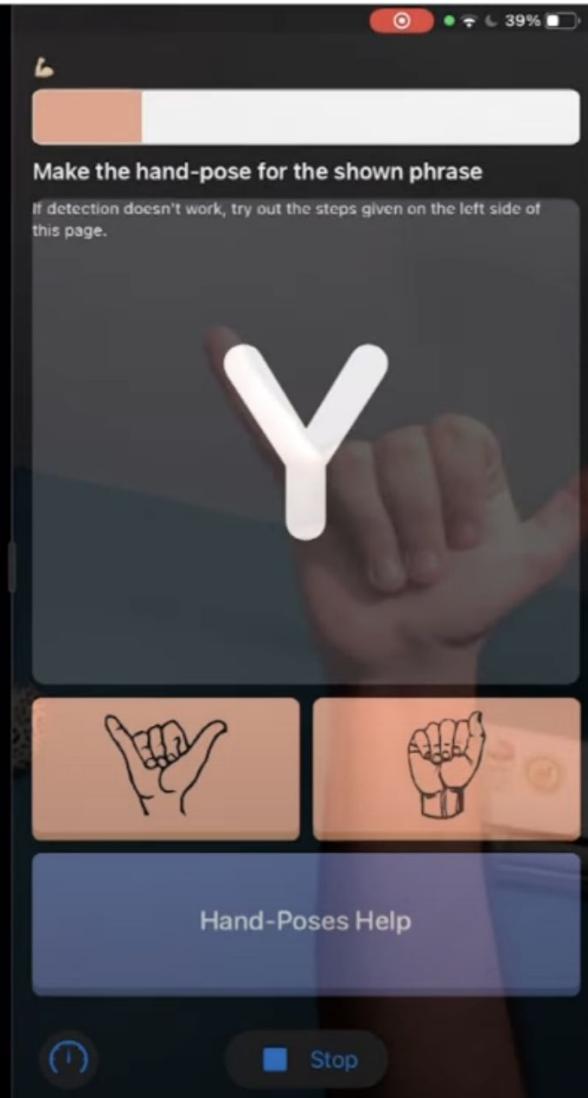
In this section, we'll look at the following alphabets:

- A:** Make a forward-facing fist and keep the thumb next to the index finger
- B:** Open your palm but bring the thumb inwards just above the base of the wrist.
- I:** Make a fist but raise your little finger while resting your thumb over the index/middle finger.
- U:** The peace hand-pose but the index and middle fingers are stuck to each other
- V:** The peace hand-pose 🙌
- Y:** A fist where the thumb and little finger's raised outwards.

Make sure the surroundings is well lit, the iPad is about half a meter away from you for accurate detection

Note

You can also open the tutorial page to view the hand-poses.



# Hand landmarks: thumb

Tip of the thumb (TIP)

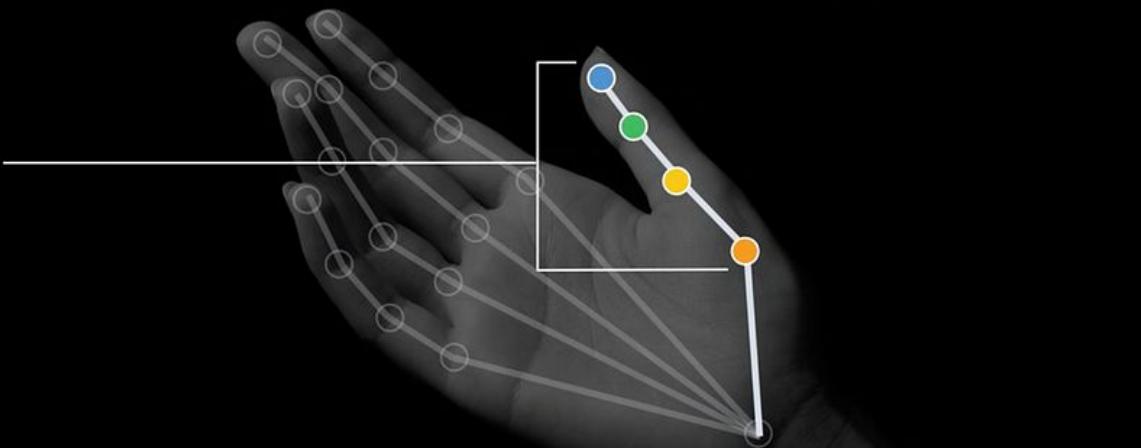
Interphalangeal joint (IP)

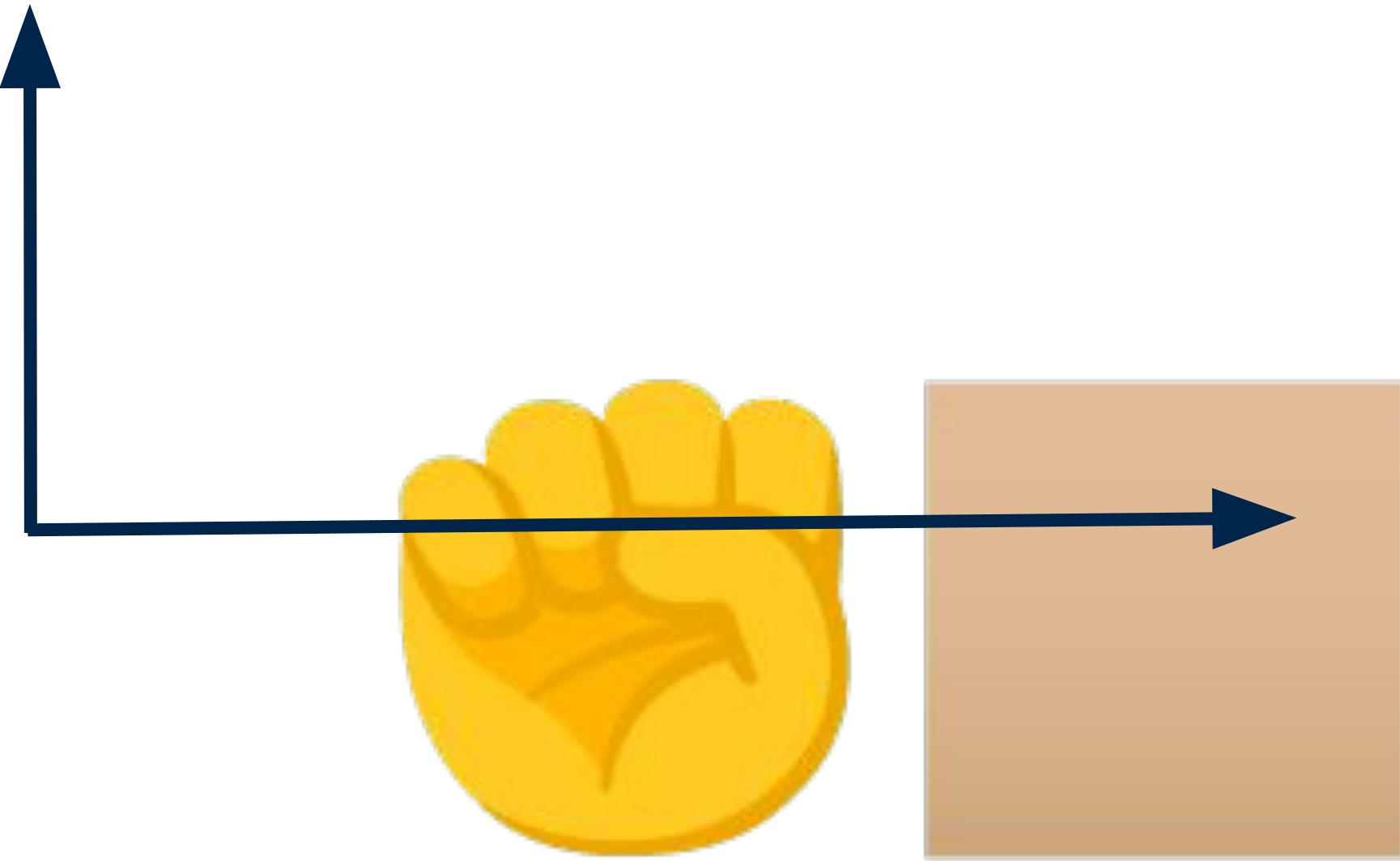
Metacarpophalangeal joint (MP)

Carpometacarpal joint (CMC)

handLandmarkRegionKeyThumb

handLandmarkKeyThumb**TIP**  
handLandmarkKeyThumb**IP**  
handLandmarkKeyThumb**MP**  
handLandmarkKeyThumb**CMC**



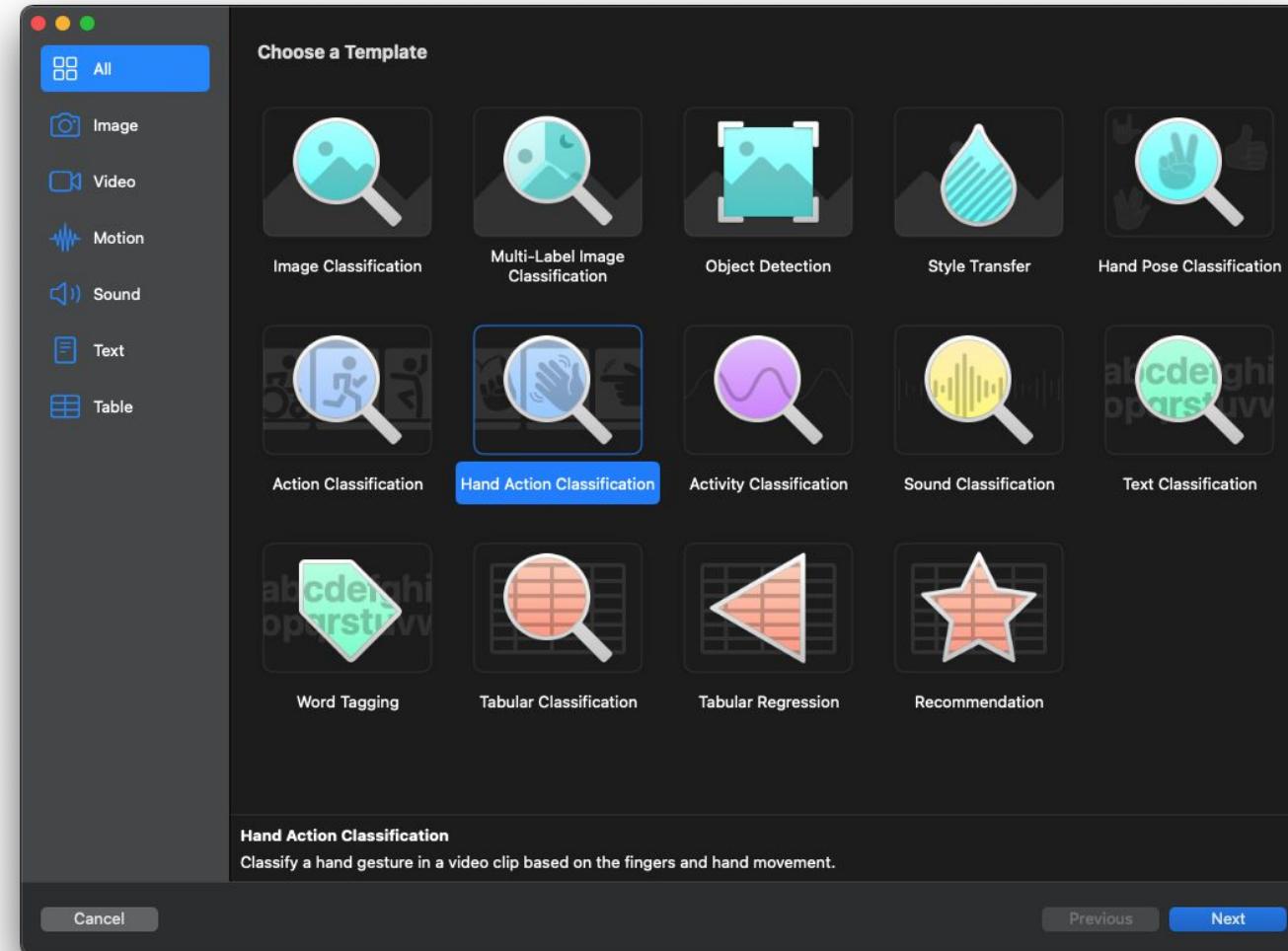


**Fist gesture: No change in Y axis coordinates**

# Plotting Hand Landmark points' coordinates

Hand Pose	Thumb TIP Coordinates	Thumb IP Coordinates	Thumb CMC Coordinates
Hello	(0.26, 0.12)	(0.12,0.18)	(0.22, 0.18)
Y	(0.86, 0.21)	(0.15,0.13)	(0.98, 0.85)
B	(0.4, 0.33)	(0.19,0.12)	(0.82, 0.98)

# WWDC 2021: CreateML adds Hand Action Classifier



The screenshot shows the Intuit Machine Learning interface for a "Hand Pose Classification Project".

**Project Overview:** Hand Pose Classification Project

**Model Sources (1):** MyHandPoseClassifier 1

**Data Sources (1):** asl\_alphabet\_train

**Settings Tab:**

- Data:**
  - Training Data:** 10 Classes, 30,000 Items, View, asl\_alphabet\_train
  - Validation Data:** Auto, Split from Training Data, Automatic
  - Testing Data:** None, +
- Parameters:**
  - Iterations: 80
  - Augmentations:
    - Horizontally Flip (checked)
    - Rotate
    - Translate
    - Scale
- Status:** Ready to train for 80 iterations

**Activity Log:**

Activity	Date
Training Data Added asl_alphabet_train	11:36 PM
Data Source Created asl_alphabet_train	11:36 PM
Model Source Created MyHandPoseClassifier 1	11:36 PM
Project Created MyHandPoseClassifier	11:36 PM
Activity	Apr 21, 2024

Hand Pose Classification Project

MyHandPoseClassifier

Model Sources (1)

MyHandPoseClassifier 1

Data Sources (1)

asl\_alphabet\_train

Drag or Add Images and Videos

+

Clear All

Completed 2 iterations

Train More Snapshot

Settings Training Evaluation Preview Output Activity

Live Preview

Blended Original Wireframe

98% 98% --

Training Validation Testing

Activity Apr 21, 2024

Training Completed 11:44 PM

2 iterations

Training Started 11:40 PM

2 iterations

Training Data Added 11:40 PM

asl\_alphabet\_train

Model Source Created 11:40 PM

MyHandPoseClassifier 1

Data Source Created 11:36 PM

asl\_alphabet\_train

Project Created 11:36 PM

MyHandPoseClassifier



B  
100% confidence

# Sources for Training Data

1. Kaggle.com
2. Hugging Face
3. Dataset Research by Google
4. Online LLMs like ChatGPT and Claude
5. Use pre-trained models
6. User generated data

# Models are extremely small

The screenshot shows a mobile application interface for a machine learning model. At the top, there is a small icon of a document with a blue 'M' and the text "MyTabularRegressor 1". Below the icon, the model's details are listed:

- Model Type: Tabular Regressor
- Size: 2 KB
- Document Type: Core ML Model
- Availability: macOS 10.13+ | iOS 11.0+ | watchOS 4.0+ | tvOS 11.0+ | visionOS 1.0+

Below these details, there are two tabs: "General" (which is selected) and "Predictions". Under the "General" tab, there is a section titled "Metadata" containing the following information:

- Description: --
- Author: Swapnil Dhol
- License: --
- Version: --

# Transfer Learning

# What is Transfer Learning

Transfer learning involves leveraging knowledge gained from training a model on one task and applying it to a different but related task, typically by fine-tuning the pre-trained model's parameters. In iOS, it reduces the need for extensive training data and computational resources.



[YamahaMusic.com](http://YamahaMusic.com)

# Tabular Regression

# What is Tabular Regression

Tabular regression is a type of machine learning task that involves predicting a continuous numeric value based on input features arranged in a tabular format.

Build a model that can accurately estimate a target variable given a set of input features.

Evaluation metrics such as **mean squared error** (MSE), **mean absolute error** (MAE), **root mean squared error** (RMSE) quantify how well the model's predictions align with the actual target values.

M1\_final — Locked

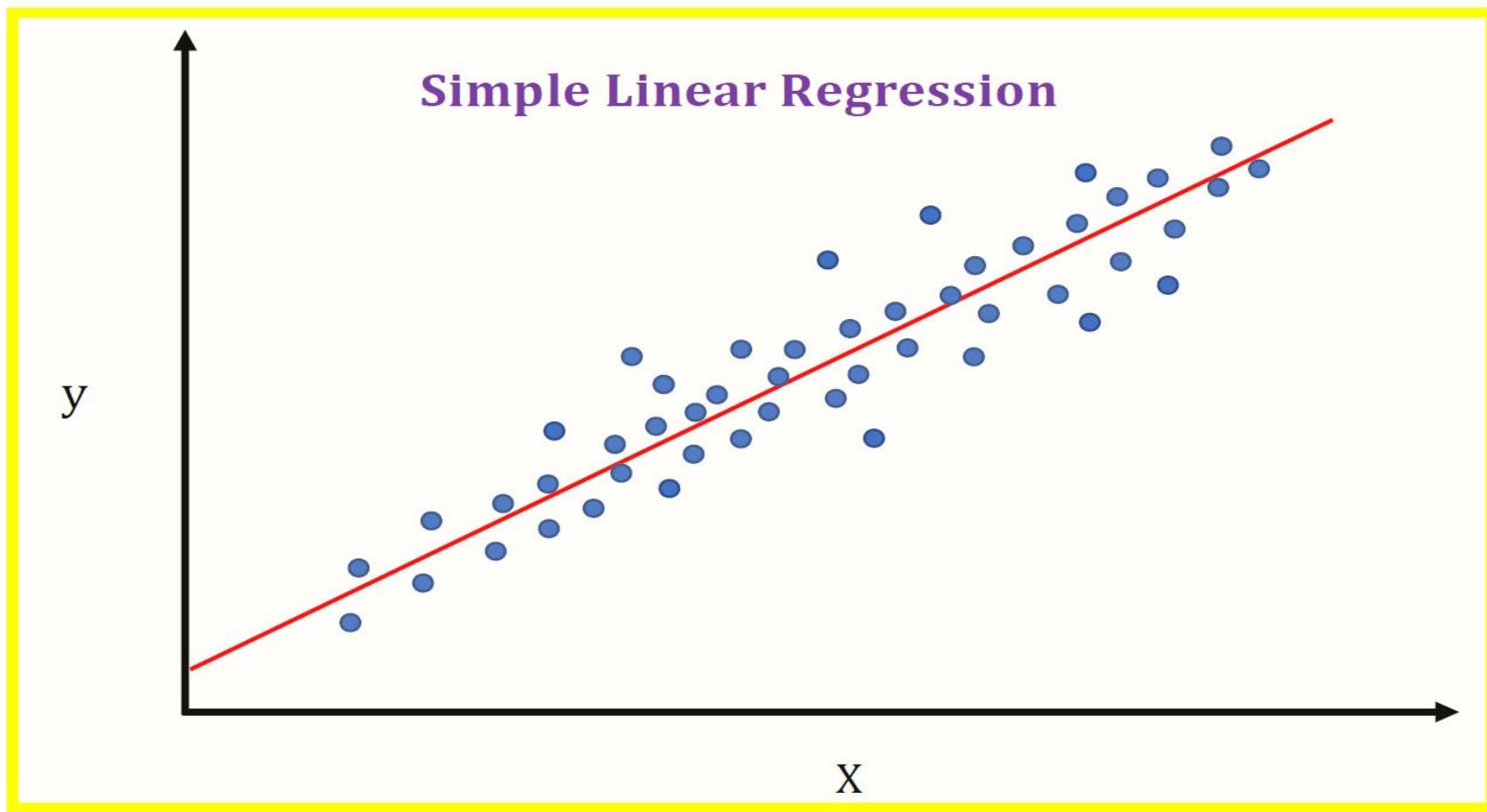
View Zoom Add Category Pivot Table Insert Table Chart Text Shape Media Comment Share Format Organise

Sheet 1

M1\_final

Y_OF_WEEK	OP_UNIQUE_CARRIER	TAIL_NUM	DEST	DEP_DELAY	CRS_ELAPSED_TIME	DISTANCE	CRS_DEP_M	DEP_TIME_M	CRS_ARR_M	Temperature	Dew Point	Humidity	Wind	Wind Speed	Wind Gust	Pressure	Condition	sch_dep	sch_arr	TAXI_OUT
5	B6	N828JB	CHS	-1	124	636	324	323	448	48	34	58	W	25	38	29.86	Fair / Windy	9	17	14
5	B6	N992JB	LAX	-7	371	2475	340	333	531	48	34	58	W	25	38	29.86	Fair / Windy	9	17	15
5	B6	N959JB	FLL	40	181	1069	301	341	482	48	34	58	W	25	38	29.86	Fair / Windy	9	17	22
5	B6	N999UQ	MCO	-2	168	944	345	343	513	48	34	58	W	25	38	29.86	Fair / Windy	9	17	12
5	DL	N880DN	ATL	-4	139	760	360	356	499	46	32	58	W	24	35	29.91	Fair / Windy	9	17	13
5	AA	N983NN	ORD	-1	161	740	359	358	460	46	32	58	W	24	35	29.91	Fair / Windy	9	17	21
5	AA	N107NN	LAX	-1	373	2475	360	359	553	46	32	58	W	24	35	29.91	Fair / Windy	9	17	26
5	B6	N274JB	BUF	-5	80	301	365	360	445	46	32	58	W	24	35	29.91	Fair / Windy	17	21	11
5	B6	N663JB	LGB	0	368	2465	365	365	553	46	32	58	W	24	35	29.91	Fair / Windy	17	21	25
5	B6	N283JB	FLL	3	184	1069	370	373	554	46	32	58	W	24	35	29.91	Fair / Windy	17	21	29
5	B6	N962JT	LAS	-5	343	2248	381	376	544	46	32	58	W	24	35	29.91	Fair / Windy	17	21	26
5	AA	N901AN	DCA	-5	95	213	384	379	479	46	32	58	W	24	35	29.91	Fair / Windy	17	21	30
5	AA	N157UW	PHX	-4	336	2153	390	386	546	46	32	58	W	24	35	29.91	Fair / Windy	17	21	24
5	B6	N967JT	SFO	-3	388	2586	410	407	618	46	32	58	W	24	35	29.91	Fair / Windy	17	21	17
5	B6	N998JE	SJU	108	222	1598	301	409	523	46	32	58	W	24	35	29.91	Fair / Windy	17	21	16
5	DL	N703TW	SFO	-6	391	2586	420	414	631	47	33	59	W	24	29	30	Fair / Windy	17	21	16
5	DL	N192DN	SLC	-5	321	1990	419	414	620	47	33	59	W	24	29	30	Fair / Windy	17	21	25
5	DL	N362NB	BOS	-5	82	187	420	415	502	47	33	59	W	24	29	30	Fair / Windy	17	21	15
5	AA	N115NN	SFO	-3	386	2586	420	417	626	47	33	59	W	24	29	30	Fair / Windy	17	21	18
5	B6	N638JB	SAV	-2	143	718	419	417	562	47	33	59	W	24	29	30	Fair / Windy	17	21	14
5	B6	N292JB	SYR	-3	73	209	420	417	493	47	33	59	W	24	29	30	Fair / Windy	17	21	21
5	B6	N806JB	ATL	0	154	760	418	418	572	47	33	59	W	24	29	30	Fair / Windy	17	21	16
5	DL	N119DU	MSP	-2	187	1029	420	418	547	47	33	59	W	24	29	30	Fair / Windy	17	21	34
5	B6	N968JT	LAX	-7	379	2475	425	418	624	47	33	59	W	24	29	30	Fair / Windy	17	21	15
5	DL	N179DN	LAX	-1	365	2475	420	419	605	47	33	59	W	24	29	30	Fair / Windy	17	21	23
5	DL	N722TW	SEA	-2	373	2422	425	423	618	47	33	59	W	24	29	30	Fair / Windy	30	26	24
5	AA	N585UW	MIA	4	184	1089	420	424	604	47	33	59	W	24	29	30	Fair / Windy	30	26	24
5	AS	N526AS	SEA	-6	380	2422	430	424	630	47	33	59	W	24	29	30	Fair / Windy	30	26	19
5	AS	N557AS	PDX	-3	375	2454	445	442	640	47	33	59	W	24	29	30	Fair / Windy	30	26	20
5	B6	N584JB	TPA	-2	180	1005	447	445	627	47	33	59	W	24	29	30	Fair / Windy	30	26	13
5	B6	N273JB	BTW	6	75	266	455	461	530	47	33	59	W	24	29	30	Fair / Windy	30	26	11
5	B6	N324JB	ORD	-4	163	740	467	463	570	47	33	59	W	24	29	30	Fair / Windy	30	26	13
5	AA	N116AN	LAX	-6	376	2475	480	474	676	50	33	52	W	21	30	30	Fair / Windy	30	26	20
5	AA	N844NN	ORD	-3	166	740	479	476	585	50	33	52	W	21	30	30	Fair / Windy	30	26	19
5	DL	N774DE	IAH	-3	253	1417	480	477	673	50	33	52	W	21	30	30	Fair / Windy	30	26	23
5	DL	N920DU	DEN	-2	271	1626	480	478	631	50	33	52	W	21	30	30	Fair / Windy	30	26	20
5	B6	N661JB	RSW	29	193	1074	449	478	642	50	33	52	W	21	30	30	Fair / Windy	30	26	10
5	B6	N983JT	LAX	-1	376	2475	480	479	676	50	33	52	W	21	30	30	Fair / Windy	30	26	12
5	MQ	N853AE	ORF	-6	88	290	485	479	573	50	33	52	W	21	30	30	Fair / Windy	30	26	25

<https://www.kaggle.com/datasets/deepankurk/flight-take-off-data-jfk-airport>



<https://medium.com/nerd-for-tech/linear-regression-icebreaker-to-machine-learning-algorithms-b5f680d19d4d>

**Data**

**Training Data** (?)  
**28,820** Items  
M1\_final.csv

**Validation Data** (?)  
**Auto**  
Split from Training Data  
Automatic

**Testing Data** (?)  
None +

**Target** TAXI\_OUT  
**Features** Choose Features...  
22 features selected  
MONTH  
DAY\_OF\_MONTH  
DAY\_OF\_WEEK  
OP\_UNIQUE\_CARRIER  
TAIL\_NUM  
DEST  
DEP\_DELAY  
CRS\_ELAPSED\_TIME  
...and 14 more

This screenshot shows the data configuration section of a machine learning tool. It includes three main sections: Training Data (28,820 items from M1\_final.csv), Validation Data (Auto split from Training Data), and Testing Data (None). Below these are settings for Target (TAXI\_OUT) and Features (Choose Features...), which lists 22 selected features including MONTH, DAY\_OF\_MONTH, DAY\_OF\_WEEK, OP\_UNIQUE\_CARRIER, TAIL\_NUM, DEST, DEP\_DELAY, CRS\_ELAPSED\_TIME, and 14 more.

# Text Classification

# What is Text Classification

- Text classification is a machine learning task focused on categorizing text documents into predefined classes or categories.
- Primary purpose is to automatically assign appropriate labels or categories to text data based on its content.
- Common evaluation metrics such as accuracy, precision, recall, **F1-score**, and area under the receiver operating characteristic curve (ROC-AUC) are used.

# Steps to train a Text Classification

- Use JSON to organize your training data where each item consists of a "text" field containing the input text and a "label" field containing the corresponding category label.
- CreateML will automatically split the data into training and validation sets, train the model using the training data, and evaluate its performance using the validation set. Adjusting parameters such as the number of iterations or the model architecture may be necessary to optimize the classifier's accuracy.



# Demo

# Q&A

Break  
Be back in 10 minutes!

Scan to join our  
Talent Community



Scan me!

# Switch to Keynote

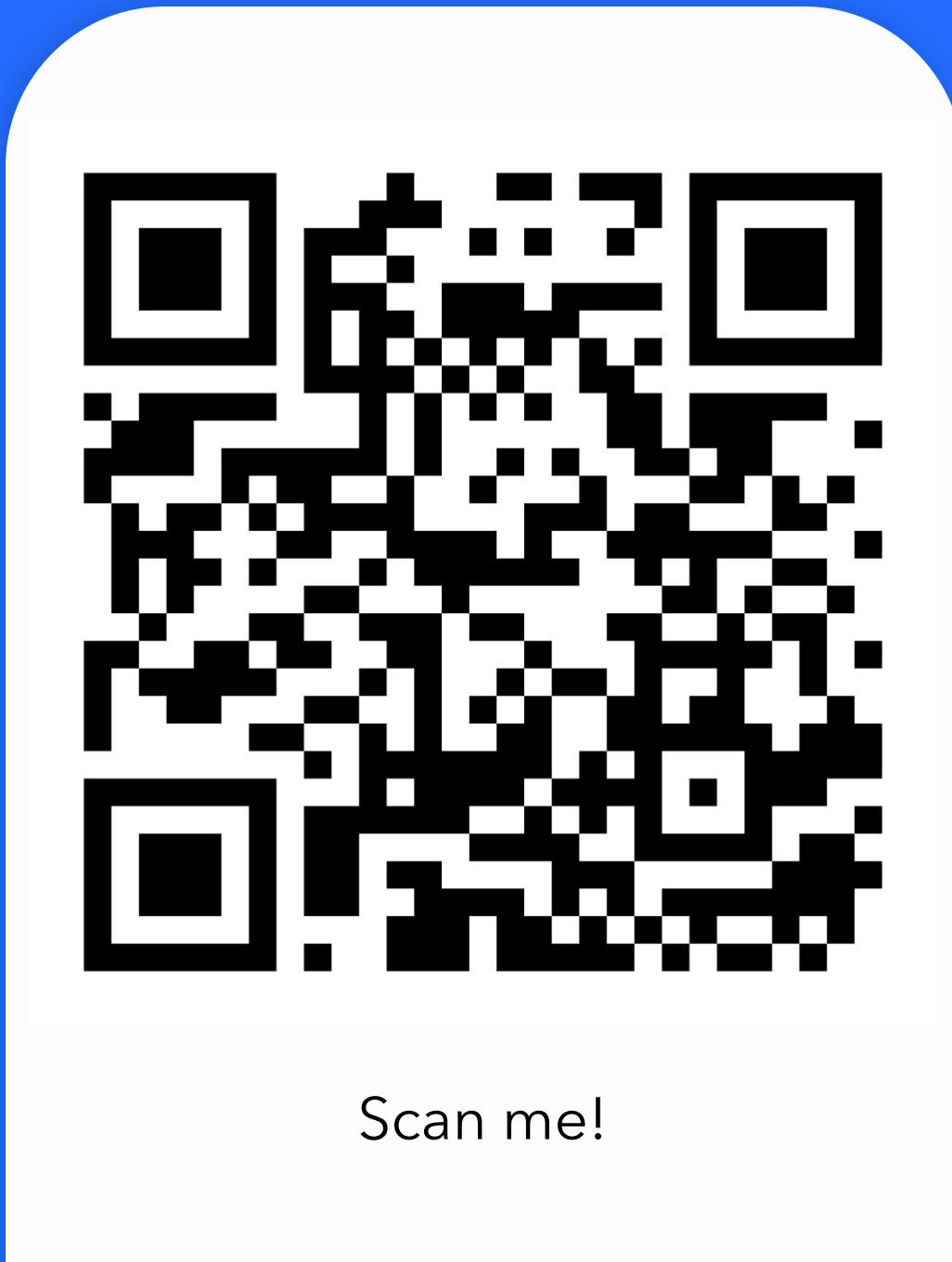


Topic: Enhancing Xcode with AI:  
building smarter editor extensions

**Speaker 3: Pavan Itagi, Senior Engineering Manager  
and a Mobile Application Architect at Code and Theory**

# Q&A

Scan this QR  
code and share  
your valuable  
feedback with us



# Meet the Swift Bengaluru Community

- This group is for developers working on Apple platform (iOS/ Mac OS) as well as the ones who are using swift to develop cloud and server applications or willing to learn so. We would meet once a month, to learn from the expert speakers and share knowledge, in an informal, discussion format.
- <https://swiftbengaluru.github.io/>
- <https://www.meetup.com/swiftbengaluru/>



**swiftbengaluru**  
the revolution will be swift

# SwiftBengaluru's Roadmap

- offline meetup - once a month
- online meetup - once a 2 month
- publish swift newsletter - once a month.
- collaborate on opensource projects
- swift 101 - deliver swift courses and publish it on Youtube channel.
- be active on discord
- blog - write one blog per month
- hackathon once a year

# **Swift Bengaluru - Core Team**



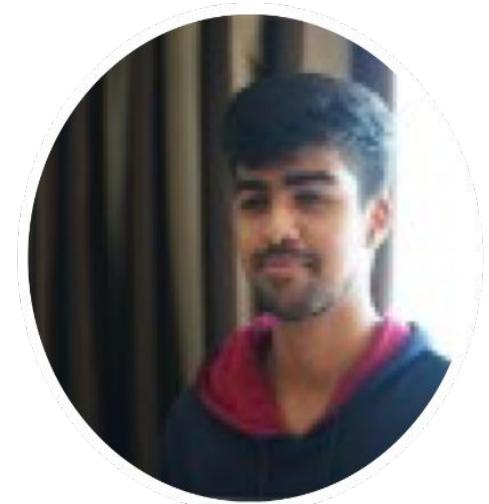
**Amit Samant**



**Nayyan Mujadiya**



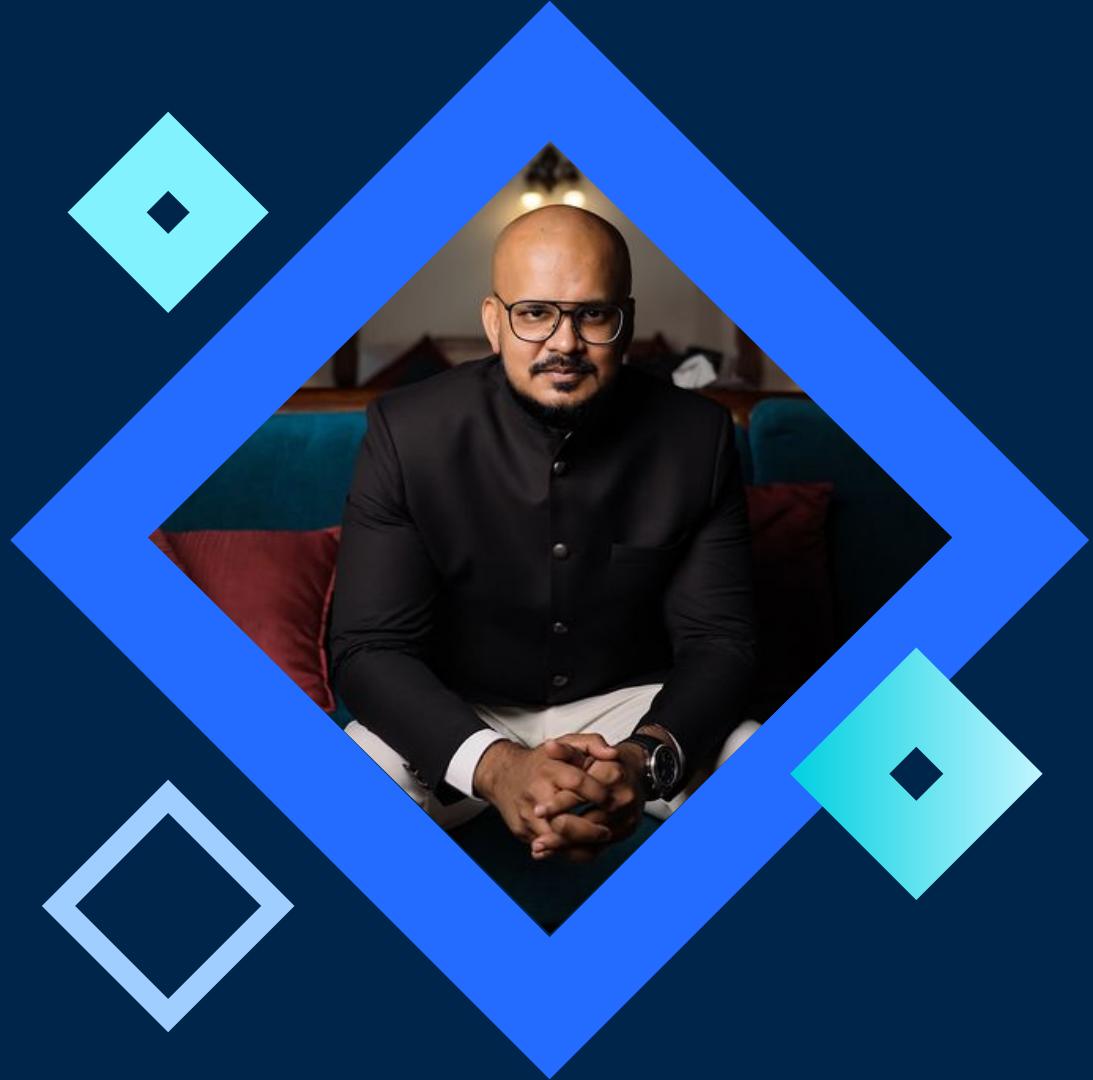
**G Abhishek**



**Gokul R**

# Community contributors

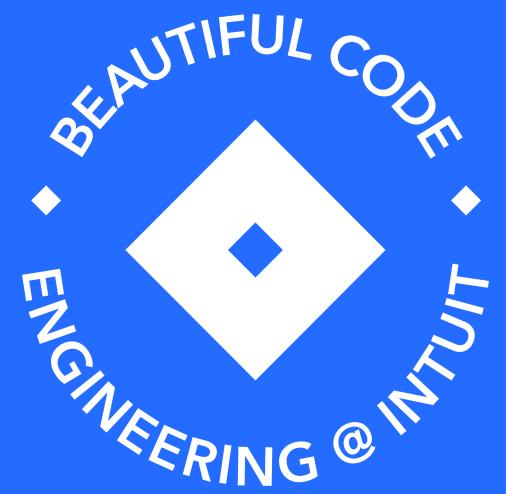
- Pran Kishor
- Khyati Mirani
- Keerthipriya
- Kumar Reddy
- Vijay Tholpadi
- Srinivasan G
- Firoz Khursheed
- Pinal Naik
- Priya Gheewala
- Marimuthu Govindhasamy
- Neeraj Kumar
- Mythri V Shenoy
- Ganapathy S Nagarajan



## Thank You Note

**Speaker: Danish Ahmed Ansari, Staff Software Engineer & Mobile Track Lead at Intuit**

# Quick recap of the Meetup!



**INTUIT**

 turbotax

 credit karma

 quickbooks

 mailchimp

# Thank you to all the speakers!

# BIG THANK YOU TO:

## **Swift Bengaluru Developers Meetup team:**

- Nayyan Mujadiya, Gokul B, G Abhishek and Amit Samant

## **Intuit core team:**

- Akashlal Bathe - Mobile Meetup Lead
- Danish Ahmed Ansari - Mobile Meetup Lead
- Eshika Shah - Our lovely host
- Dhruti Karia - Program Manager, Mobile Track and Tech Culture Champions Community
- Nancy Bansal - Events manager
- Branding and Comms Team
- Tech Culture Champions Community
- Intuit India leadership
- And Workplace Facilities & AV teams

## **External enthusiasts from:**

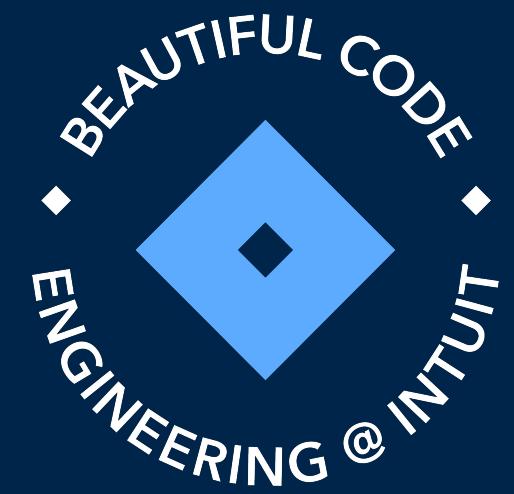
PocketFM, Ola, Redbus, Western Digital, Flipkart, Swiggy, Phonepe, Gojek and Mercedes Benz



Please pose  
for a picture

:)

# Thank you

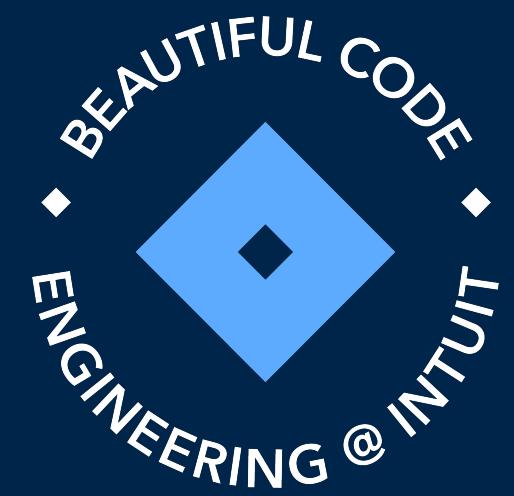


# Instructions

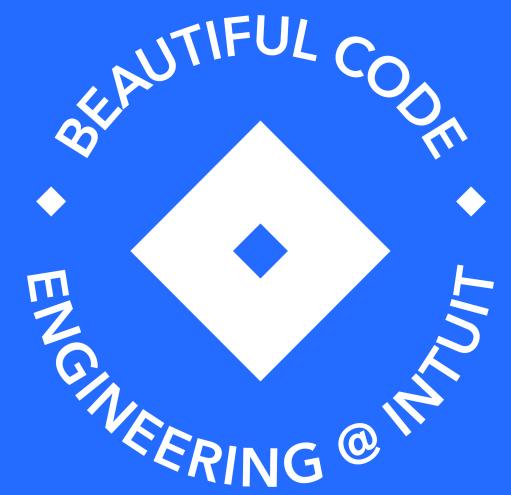
This document is a template

1. Make a copy to create your custom presentation (File > Make a copy).
2. Delete this slide.

Click here to add  
a divider title



Click here to add  
a divider title



Click here to add  
a divider title

# Blank slide

**Subtitle**

# 1 - Column

## Subtitle

### Paragraph titles in sentence case

Introductory or main content. Bullets can be applied by using the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

# 1 - Column with Bang Box

## Subtitle

### Paragraph titles in sentence case

Introductory or main content. Bullets can be applied by using the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

Use this 'Bang Box' to highlight an important takeaway. Do not exceed more than one line of text.

# 2 - Columns

## Subtitle

### Paragraph titles in sentence case

Introductory or main content. Bullets can be applied by using the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

### Paragraph titles in sentence case

Introductory or main content. Bullets can be applied by using the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

## 2 - Columns with arrow

### Paragraph titles in sentence case

Introductory or main content. Bullets can be applied by using the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

### Paragraph titles in sentence case

Introductory or main content. Bullets can be applied by using the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

# 3 - Columns

## Subtitle

### Column 1

Introductory or main content.  
Bullets can be applied by using  
the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

### Column 2

Introductory or main content.  
Bullets can be applied by using  
the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

### Column 3

Introductory or main content.  
Bullets can be applied by using  
the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent

# 3 - Columns with photos

## Subtitle



### Column 1

Introductory or main content.  
Bullets can be applied by using  
the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent



### Column 2

Introductory or main content.  
Bullets can be applied by using  
the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent



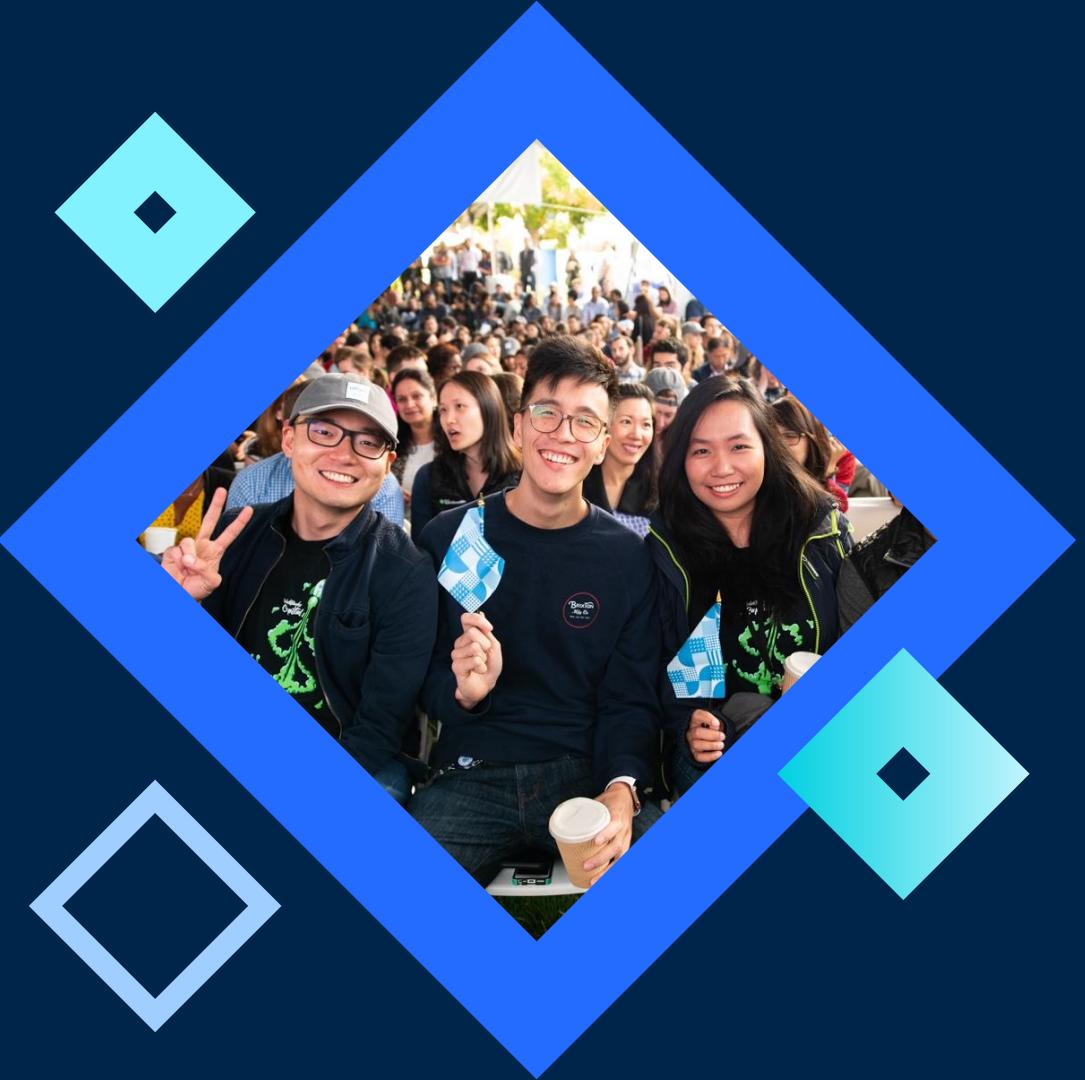
### Column 3

Introductory or main content.  
Bullets can be applied by using  
the increase indent control.

- Bullets use 3rd level text indent
  - And 4th level indent



Big statement  
placeholder for  
emphasis.



Quote + photo layout. Ideally,  
a quote that is at least three lines  
long fits well.

– [Quote attribution here](#)



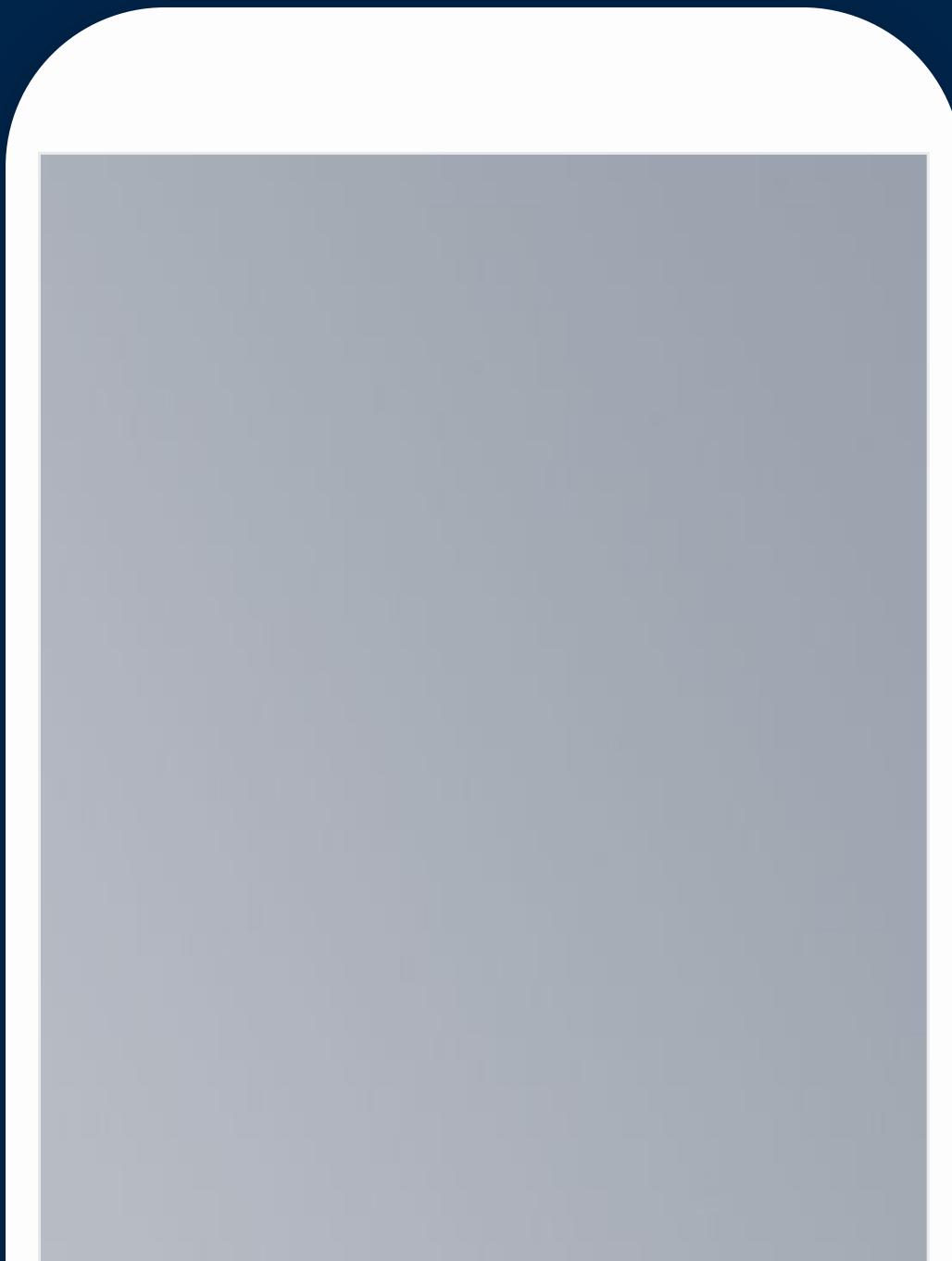
Quote + photo layout. Ideally,  
a quote that is at least three lines  
long fits well.

– Quote attribution here





Click to add  
slide title

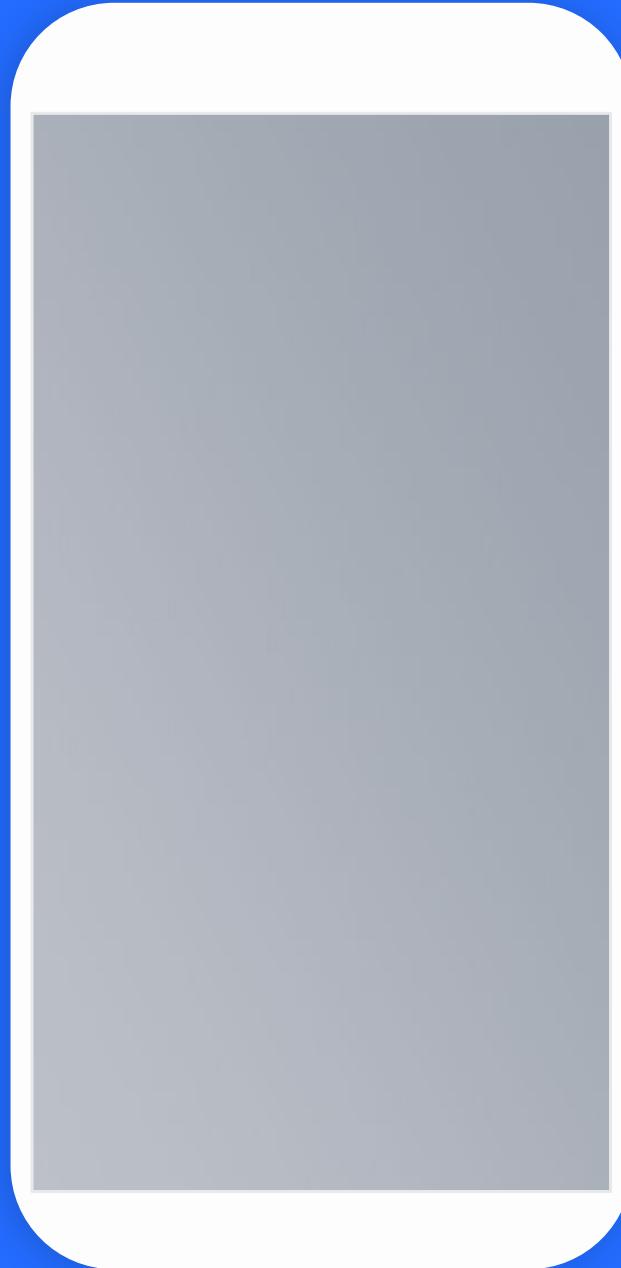


Click to add  
slide title

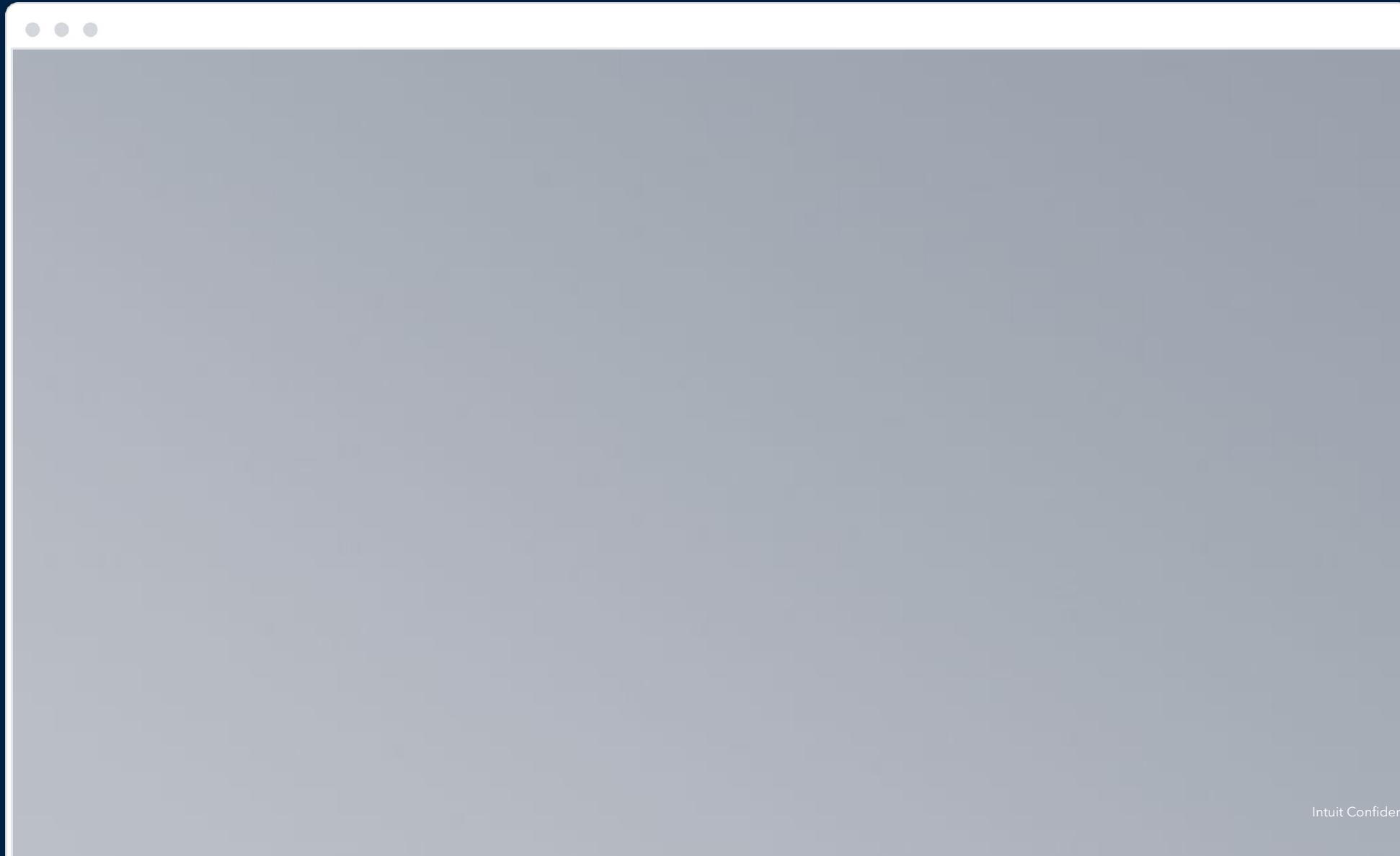
Click to add  
slide title



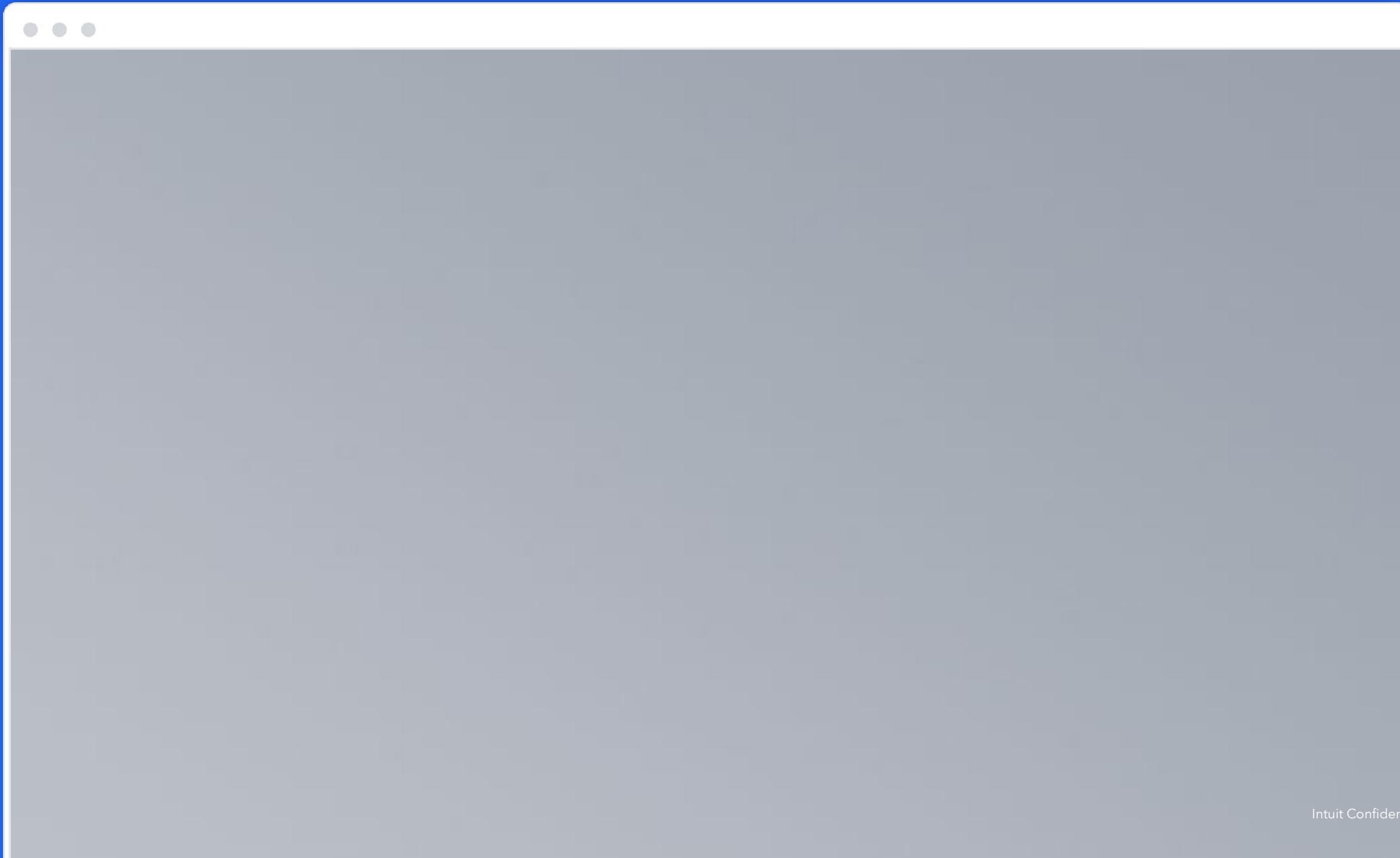
Click to add  
slide title



# Click to add slide title



# Click to add slide title



# Q&A