

# Auto insurance study



Towards understanding customers'  
insurance needs

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# Agenda

1. Introduction - Business Understanding
2. Analysis - Customer Segmentation
3. Summary of main findings
4. Recommendations
5. Future Work

# Introduction



# Business Understanding

- ▷ **Industry:** Auto insurance
- ▷ **Market:** US (Western states)
- ▷ **Challenge:** Keep Claims-to-Premium ratio low.
- ▷ Assess customers by **customer lifetime value (CLV)**:
  - $CLV = \text{Premium} - \text{Cost}$
- ▷ **Objective:** Understand existing customers' insurance needs.



## Research Question



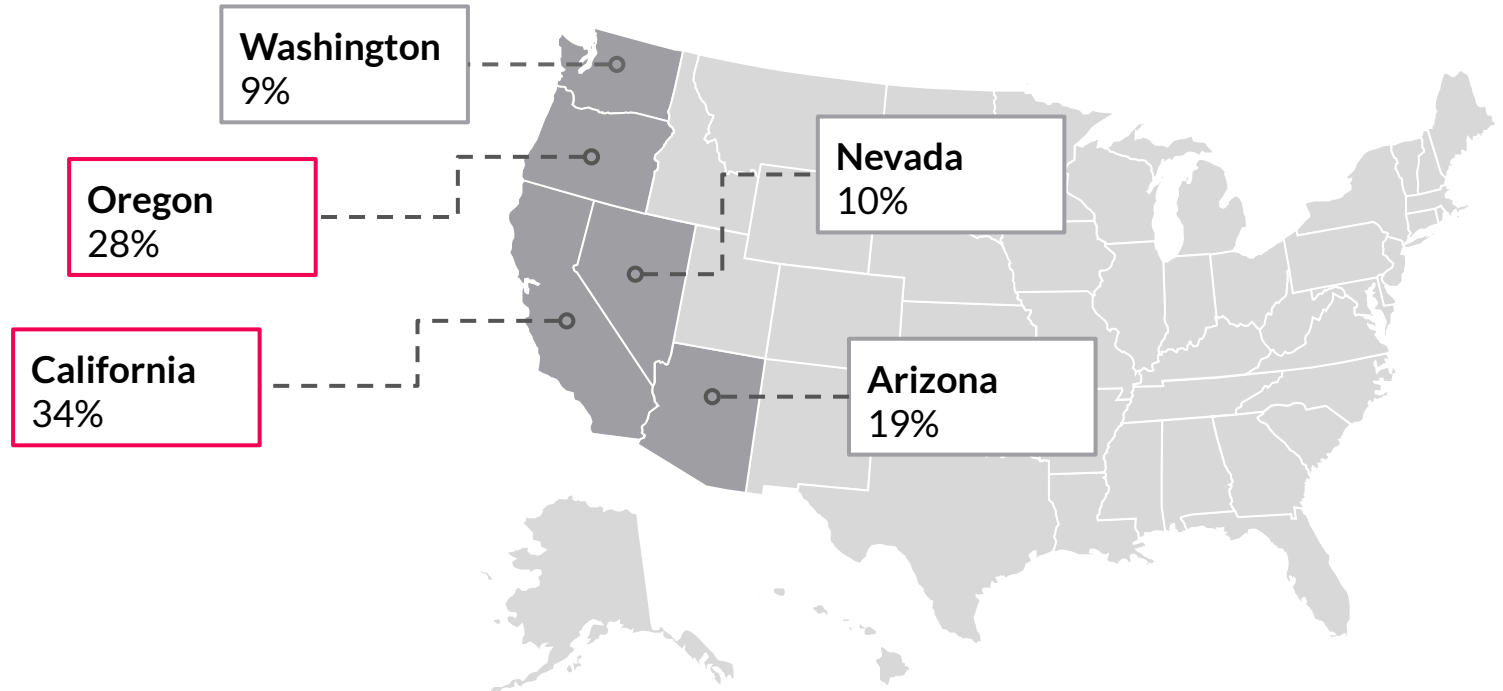
*What are the customers' characteristics  
based on past purchases?*

# Customer segmentation



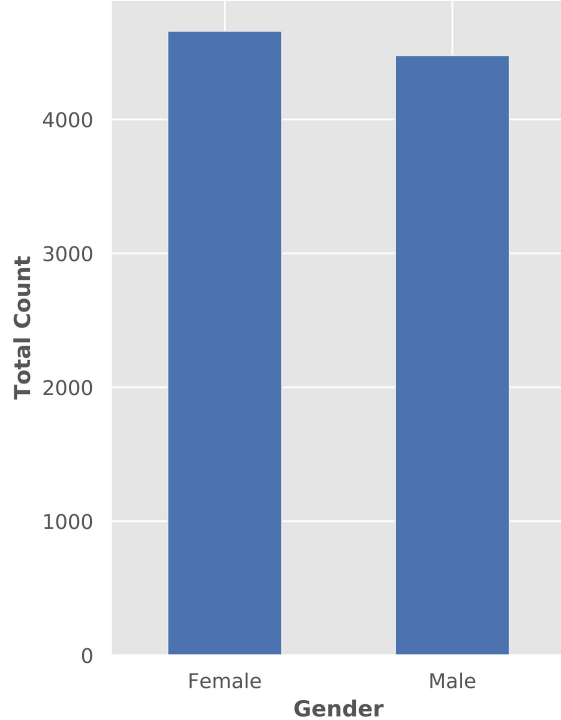
# Largest Market: California and Oregon

**Total Clients: 9134**

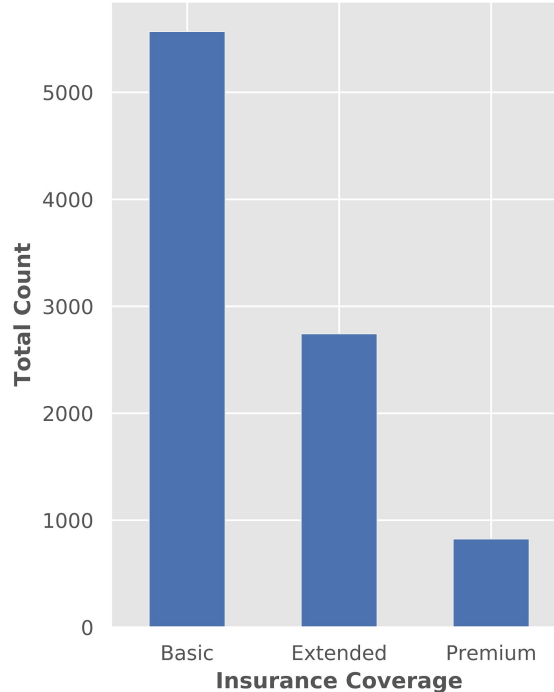


# Majority: Basic coverage; CLV < \$20,000

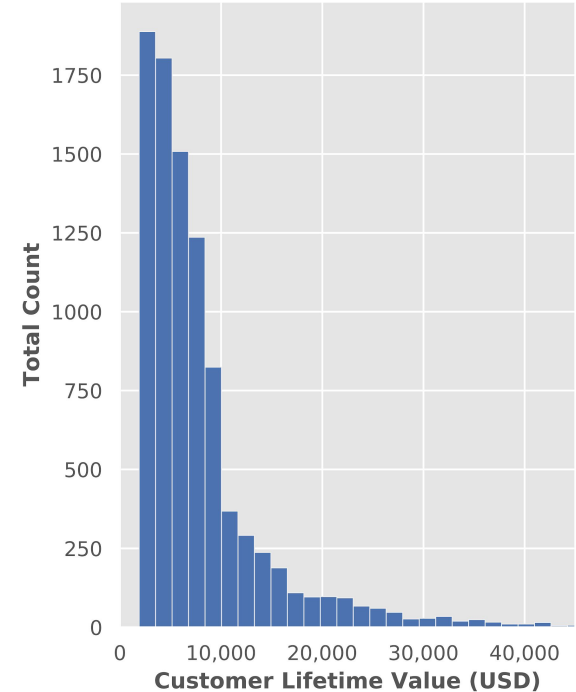
**Client Distribution by Gender**



**Client Distribution by Insurance Coverage**



**Client Distribution by Customer Lifetime Value**





# Data Clustering: $k$ -Prototypes

- ▷ **9134 unique customers.**
- ▷ **24 Customer Features:**
  1. Background (e.g., Gender, Income, Location)
  2. Insurance info (e.g., CLV, Coverage, Monthly Premium)
  3. Marketing (Sales Channel)
- ▷ **State-of-the-art clustering:  $k$ -Prototypes**
  - Suitable for both numerical and categorical features.

# Most valuable customers: CLV (\$27,400), Basic Coverage w/ only 2 policies

	Group A (7%)	Group B (5%)	Group C (30%)	Group D (58%)
Average CLV	\$27,400	\$14,900	\$7,800	\$5,200
Average Total Claim	\$410	\$1200	\$610	\$280
Average Monthly Premium	\$100	\$200	\$110	\$75
Most Preferred Coverage	Basic	Premium/Basic	Extended	Basic
Number of policies	2	1 to 9	1 to 9	1 to 9

# Highest Average CLV (\$27,400): Basic Coverage w/ only 2 policies

	<b>Group A (7%)</b>	Group B (5%)	Group C (30%)	Group D (58%)
<b>Most Preferred Coverage</b>	Basic	Premium/Basic	Extended	Basic
<b>Most Preferred Vehicle Class</b>	4-Door Car/SUV	Luxury Car/SUV	SUV	4-Door Car
<b>Most frequent drivers by gender</b>	Female	Male	Female	Male
<b>Most frequent drivers by location</b>	Oregon/ California	California	Oregon	Oregon/ California

# Summary and Recommendations

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# Summary

- ▷ **Largest market:** Oregon and California (~63%).
- ▷ **Highest CLV:** Female drivers, SUV, under Basic coverage w/ only 2 policies (avg. monthly premium ~ \$100).
- ▷ **Lowest CLV:** Male drivers, 4-Door Car, under Basic coverage (avg. monthly premium ~ 75\$).
- ▷ **Premium coverage:** Male drivers, Luxury car/SUV.
- ▷ **Extended coverage:** Female drivers, SUV.

# Recommendations

- Recommend Basic coverage as the starting point for new clients and be proactive to customers' need.
- Focus marketing efforts on California/Oregon and consider reducing marketing for other states.
- Consider loyalty offers to new and existing customers.
- Investigate policies under Basic coverage that are associated with high and low CLV.

## Future Work

- ▷ Improve existing clustering model with new data/additional features.
- ▷ Build a CLV model that can describe customer's future purchase behaviour (i.e., future lifetime value).



# Appendix: Other distributions

