ON CHAIN TRANSACTION AUTOMATION USING INTENTS BASED USEROP.JS

A PROJECT REPORT

Submitted by

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Under the Guidance of

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in partial fulfillment of the requirements for the degree of

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in
COMPUTER SCIENCE ENGINEERING

with specialization in <<BLOCKCHAIN TECHNOLOGY>>

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COLLEGE OF ENGINEERING AND TECHNOLOGY

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KATTANKULATHUR- 603 203

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Title of Work : On Chain Transaction Automation Using Intents Based Userop.Js

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Certified that this project report contains work as part of the course 21CSE378P – Generative AI for Business use cases. The title of the Project is "**On Chain Transaction Automation Using Intents Based Userop.Js**". It is the bonafide work of **SWASTIK DAS [RA2111050010006], HARSH SRIVASTAVA [RA2111050010046]** who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form any other project report or dissertation on the basis of which a qualifying mark or award was conferred on an earlier occasion on this or any other candidate.

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Authors

ABSTRACT

This paper explores the challenge of reducing user friction when interacting with Web3 protocols by leveraging natural language processing through Large Language Models (LLMs) and the UserOP.js library. Traditional interactions with decentralized applications (dApps) involve multiple steps, such as managing wallets, signing transactions, and navigating through complex interfaces. This often leads to high cog nitive load and a steep learning curve, making it difficult for users, especially those new to the blockchain ecosystem—to engage with Web3 technologies effectively. Our research addresses this issue by proposing a system that enables users to express their intentions in plain natural language, which is then processed and translated into specific blockchain transactions. The research further discusses the design and implementation methodology, including the integration of MetaMask for wallet interactions, OpenAI API for intent recognition, and UserOP.js for trans action handling. Through this architecture, the solution aims to bridge the gap between user-friendly design and technical efficiency, reducing barriers to entry and encouraging wider adoption of Web3 technologies. Moreover, the implications of this approach extend beyond improving user experience; it has the potential to reshape how decentralized plat forms are designed and utilized. By enabling intuitive natural language commands to drive complex blockchain interactions, this system could unlock new use cases and applications within the decentralized ecosystem, making blockchain technologies more accessible to both technical and non-technical users.

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INTRODUCTION

1.1 General

The project, "Reducing User Friction to Interact with Web3 Protocols Using Intents via LLM Based on UserOp.js," seeks to address a significant barrier to the adoption of decentralized applications (dApps) and blockchain technology: the user experience. While Web3 offers decentralized and trustless interactions that could revolutionize various industries, it often demands that users navigate complex interfaces and multi-step processes. These requirements can be overwhelming, especially for those unfamiliar with the technology. Our work leverages the capabilities of natural language processing (NLP) and large language models (LLMs) to enable a more intuitive and accessible way for users to interact with dApps. By allowing users to simply express their intent in natural language (e.g., "send 10 tokens to a specific address"), the system uses LLMs to convert these intents into transaction requests, which are executed on-chain via UserOp.js. This novel approach minimizes the need for manual input and technical knowledge, making blockchain technology more approachable and user-friendly.

1.2 Motivation

The motivation behind this project stems from the challenges encountered by everyday users who wish to participate in the Web3 ecosystem. Although decentralized technologies offer numerous benefits, including increased transparency and autonomy, the complexity of current interfaces acts as a significant roadblock to widespread adoption. The typical process of using dApps involves multiple steps such as selecting wallet interfaces, manually entering transaction details, and signing the transactions, which can be intimidating and error-prone. This project aims to reduce the cognitive load on users by abstracting away the intricacies of blockchain interactions. By using LLMs to translate user intentions into executable blockchain transactions, we simplify the interaction process and enhance the accessibility of Web3 technologies for a broader audience, including non-technical users.

1.3 Sustainable Development Goal of the Project

The project aligns with several United Nations Sustainable Development Goals (SDGs), particularly SDG 9: Industry, Innovation, and Infrastructure. By simplifying the

accessibility of blockchain technology, the project fosters innovation and encourages the adoption of emerging digital infrastructure. The work supports the development of sustainable, resilient, and inclusive infrastructures by making it easier for individuals and businesses to leverage decentralized systems. The project also contributes to SDG 10: Reduced Inequality, as it aims to democratize access to decentralized financial services and other blockchain-based solutions. Furthermore, the optimized transaction processes that come from using intent-based automation can reduce unnecessary energy consumption and computational load associated with traditional blockchain interactions, indirectly supporting SDG 13: Climate Action by promoting efficient use of technology.

CHAPTER 2

LITERATURE SURVEY

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APPENDIX A

CODING

```
import {Box,Button,HStack,Heading,Icon,Input,Stack,Text,VStack,useToast} from "@chakra-ui/react";
import { useQuery } from "@tanstack/react-query";
import { NextPage } from "next";
import { useState, useEffect } from "react";
import { BsFillMicFill } from "react-icons/bs";
import dynamic from "next/dynamic";
import { useContext } from "react";
import { SmartAccountContext } from "../contexts/SCWContext";
import {
  IHybridPaymaster,
  SponsorUserOperationDto,
  PaymasterMode,
} from "@biconomy/paymaster";
// import { useReactMediaRecorder } from 'react-media-recorder'

declare global {
  interface Window {
    ethereum: any;
  }
}

// const SocialLogin = dynamic(() => import('../components/SocialLogin'), { ssr: false })
const BiconomySocialLogin = dynamic(
  () => import("../components/v2SocialLogin"),
  {
    ssr: false,
  }
);
```

```
const getIntent = async () => {

  if (!command.toLowerCase().includes("send")) {
    const options = {
      method: 'POST',
      headers: {
        'Content-Type': 'application/json',
        'Access-Control-Allow-Origin': '*',
      },
      body: JSON.stringify({ body: `${command}` }),
    };
    const response = await fetch('http://localhost:8000/completion', options);
    toast({
      title: "Transaction Submitted",
      description: `Borrowing 0.0001 USDT from AAVE Pool. \n
                    0.0001 USDT will be transferred from Pool address 0x0b913A76beFF3887d35073b8e5530755D60F78C7
                    to your account ${account}`,
      status: "info",
      duration: 10000,
      isClosable: true,
    });
    const data = await response.json();
    console.log("Transaction hash is :",data);
    setLoading(false);
    setTxHash(data);
  }
  else{
    let url = `https://intents-api.onrender.com/intents`;
    setLoading(true);
    console.log(`Execuing command: ${command}`);
```

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